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For Nine Computers

PLUS: Software Reviews
Diary of a Game Designer





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Cover Photo © Stan Fellerman

INSIDE STORY

In the front of every magazine, there is a long list of names and titles called a masthead. Very few people—outside of the families of the editors—ever read it. After all, who really cares who the junior assistant contributing copy checker is? Unless you're related to somebody at ENTER (Hi, mom!), you've probably never read our masthead, which sits next to this column. But we've just added something important. See where it says "Youth Advisors" (around the middle somewhere)? Well, those six names are all kids, and an important part of our magazine. And we need four more reader/advisors. Maybe you could be one.

The "Youth Advisor" board began when we noticed that we'd been talking to a lot of kids who were doing interesting things with computers. We found that those kids had a lot of smart things to say about computers, and about ENTER. We realized we wanted them to be a part of ENTER on a regular basis.

So we asked Bela Selendy, 16, Greg Trautman, 17, Elizabeth Disney, 13, Eric Babinet, 16, Dan Lhamon, 13, and Cynthia Elias, 13, if they would join us as advisors and contributors. We wanted to know what they thought was exciting in computers and games, and what they liked and didn't like about ENTER. We promised to hook them up to a telecomputing network, to consult with them about articles, to have them write for us, and to bring them to New York once a year.

We've been pleased with their help. They come from New York, New Hampshire, California and Connecticut. But we'd like to add four more kids, making it an even ten.

If you'd like to be part of our Youth Board, drop us a note. Tell us (1) what your experience with computers has been, (2) how you would make ENTER better, and (3) why you'd like to be on our board. Send the note in by May 15. We'll pick four kids, and tell you by June 15 if you're one of them.

Write to us at ENTER ADVISORS, ENTER, 1 Lincoln Plaza, New York, NY, 10023. We'll be looking for you!

Ira Wolfman

Ira Wolfman
Editor

enter™

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FEEDBACK

LET ME ENTER-TAIN YOU

I'd like to thank you for helping me keep my head above water when I'm around my hacker



friends, and for so many hours of pure entertainment.

I'm always brimming with ideas and creative thoughts every time I finish reading your magazine. I hope that in the future you will continue to spotlight some of my fellow readers' creativity and genius as you did in "The ENTER Hall of Fame—Mean Screen Machines" contest in the February 1984 issue. —Tami Stephens, 15 Highland, CA

NAVY DISPATCH

I am in the U.S. Navy, stationed aboard the U.S.S. Midway, an aircraft carrier which is currently home-posted in Yokosuka, Japan.

During my one and a half years in Japan and the Far East, I have

gotten very interested in synthesizers. The models I currently own are a Roland Jupiter 6, SH-101, Drumatrix and a Korg Poly 800.

I bought the Dec./Jan. '84 issue of your magazine because of the promise on the front: "Thomas Dolby, The Police and Others Make Computers Rock—And You Can, Too!" Your magazine got me started on computerizing music.

I am currently in a band on our ship, Crystal Spade, and we have several thousands of dollars worth of equipment at our disposal. While we are over here we have bought all the equipment (Japanese) for a fraction of stateside costs, and that is one reason for my wanting to "computerize" my keyboards while stationed in Japan; it's cheaper!!

—Steven M. Barlow AQ2
USS Midway (CV41)
FPO San Francisco, CA

COMMANDEERING THE COMMODORE

My family is just about to get a Commodore 64 computer. They (my family) expect me to know most everything about it, because I'm a "whiz" at the TRS-80 III. What should I do?

—Derek Pattison
Racine, WI

Dear Derek:

Sounds like a case of computer fright. Relax. There's no reason to think that if you picked up programming on the TRS-80, you won't have just as easy a time on the Commodore. Besides, the

differences aren't major. Just make sure you carefully read the manual first. Before long they'll think you're a "whiz" on the Commodore, too. —Ed.

CONTEST CRAZE

In future issues, will ENTER have more contests? If you do, what will they be about? Who can enter?

—Leeanne Miller
San Francisco, CA

Dear Leeanne:

First of all, anyone can enter ENTER contests. They'll run in about every other issue, and be as fun and challenging as we can make them. Look for our robot contest in the June '84 issue. Find the robot and it's yours! —Ed.

WRITE TO ENTER WITH YOUR COMPUTER

There are now two ways to send electronic mail to ENTER. Last month, we told you how to contact us through The Source. Now, we can get messages from those of you who subscribe to CompuServe. Our CompuServe ID is 72456, 1776.

In case you didn't see it last issue, our ID number for The Source is BB113. Drop us an electronic line. The next time we type GO EMAIL, we expect to see a whole disk full of messages waiting.

(Continued on page 62)



SHOPPERS' DELIGHT

Ding! Dong! No, that's not Aton calling—it's Comp-U-Store.

With Comp-U-Store, you can use your home computer to shop at home. This mainframe service lets you select from over 60,000 items, including stereos, home appliances, video players, and more.

Comp-U-Store works like this: once you're connected via modem, you type in the name of the product you're interested in. The store's computer asks a variety of questions: How much are you willing to spend? What special features are you interested in? Comp-U-Store then provides a list of items with the features you want at a price you can afford. You type in the model you like, your credit card number and your address. In a week or so, your selection is delivered.

If you miss the hustle and bustle of department stores, however,

never fear. A video version of Comp-U-Store is now being tested in various department stores. With this system, laser disc technology lets shoppers actually see the products before they blow their hi-tech budgets buying them.

COMPUTER BY CRAYON

Color this bit! High-tech. *The New Technology Coloring Book* by Rita Aaro and Howard Rheingold lets you make a pixel perfect picture of all kinds of technological marvels.

You can color a DNA molecule, fill in a coded message sent into space, or add shades to the portrait of a famous physicist. You can even paint the heat patterns of the body and the heat-sensitive sections of the Space Shuttle.

The color-by-number pages can be colored with crayons, pencils, or pens. And some of the colors are filled in pixel-by-pixel. That means you color one picture point at a time—just the way a



computer creates graphics on the screen.

Only we don't think the computer uses crayons.

SMELL-O-RAMA

Something smells fishy around here—or is it minty? No, wait a minute, it smells more like an ocean breeze.

Whatever it is, you can change the aroma just by changing the disk in the Aromance Aroma Disk System.



The scents are "played" by inserting a 3½-inch record-like disk filled with selected aromatic oils into the "Fragrance Record Diffuser." This device heats the disks and releases the aroma. Standard disks last about an hour; there are also long-playing choices that last five hours or more.

The idea seems to be a hit. Two other companies, Remington Products, Inc., and Charles of the Ritz, are also making similar players. It may seem silly, but it really makes scents.



3-D SHUTTER-BUG

Here's something that will capture those special moments in life—the Nimslo 3-D camera. It takes three-dimensional photographs that stand out in a crowd.

Unlike conventional cameras, the Nimslo 3-D has four lenses. Each lens records a slightly different angle on your subject. These images are then combined when the film is developed. Then you've got a 3-D picture that's sure to make your friends look twice... or even three times.

The Nimslo 3-D camera isn't only for shutter bugs. It's entirely automatic. You don't even have to focus or set shutter speeds. And the camera uses regular 35mm film; the only difference is that instead of one frame per picture, it uses two.

And with the photos you take you may occasionally be tempted to peek behind the print—just to make sure that it's really only a photograph.

DUST BUSTER

Does your computer suffer from dust? Is your keyboard cov-

ered with accumulated dirt? Well then, Mini-Vac, Inc. of Glendale, California, may have the dust buster for you.

Dust Buster is a tiny vacuum cleaner that's powerful enough to remove dust particles from hard-to-reach areas around a computer keyboard. It comes with two vacuuming wands, two fine bristle brushes and a cloth vacuum bag. Dust Buster's versatile, too—it can also pick up pesky particles on your camera lens, or tape deck.

Still, prevention is the best solution. Keep your computer covered, and you'll probably never need worry about it turning into a dust bowl.

BASIC BLUES

Take two honky tonk singers from Delray Beach, Florida. Match 'em with a songwriter whose daughter's beau only has eyes for his TRS-80. What do you get? Well, it may not top the charts, but "BASIC Ain't the Language of Love," will certainly strike a chord with some of you.

Take these side one lyrics, for instance:
 "If only we had never stopped
 At that computer store.
 He'd think of disks and printers
 less,
 And love me more.
 But he keeps writing programs
 And tries to make 'em run,
 And I'm not having any fun.
 He dreams of modems and routines,
 Of bits and bytes and chips and screens.
 One day I'm gonna pull its plug
 'Cause BASIC ain't the language
 of love."

Composer Felicia Scherer resolves the onus on side two of this

45 record. Well, all's fair in love and software.

DOORWAY TO STARDOM

Tired of looking through the mail slot to see who's at the door? Well, then, turn on your TV set!

With the Video Doorbell from GBC Security of New York City, you can actually see who's at the door by tuning to a pre-set channel. The "doorbell" is really a tiny camera that attaches to the door.

"It's a toy and a security device," says GBC's Burnadette Petibies. "Video-crazy people will love it."

But watch out for video-crazy



friends who want to be TV stars. They might start singing and dancing on your doorstep.

(Continued on page 57)

We want BITS! Win a t-shirt if we use your news. Send news items to: "Bits Editor," ENTER, 1 Lincoln Plaza, New York, N.Y. 10023.

RANDOM ACCESS

ON LINE CHIP-CHAT

BY DAVY PAYTON

Every week I meet people from all over the country without ever leaving home. The way I do it is with a computer and a modem. I'm hooked up to the CompuServe Information Service.

CompuServe is a lot of fun. Like The Source and other mainframe services, CompuServe lets its subscribers do a lot of different things. I've played games, written to people on electronic mail and even researched a topic using the system's encyclopedia. But my favorite activity is using the CB simulator.

Just like with a regular CB radio, CompuServe's CB has channels. You can communicate with anybody who's tuned into the same channel that you're on. You talk to people by typing back. Whenever you want, you can switch to another channel and see who's there.

I made lots of friends over CB. There's LooLoo, who lives in Columbus, Ohio; Blaise, who lives in Omaha; Teddy Bear in Cleveland; Good Buddy in San Antonio; Spock in California; and Angel in Ohio.

Angel is special. She is deaf and blind and works for the Library of Congress. She has a special computer screen that makes "bumps" in Braille so that she can read messages.



Davy is dogged about networking.

My CB name—or handle—is CompuKing, and I live in Huntington, West Virginia. Even if I lived in a big city like New York, I couldn't meet as many people from all parts of the United States as I have met and gotten to know on CB.

When I hooked up to CompuServe and started using the CB simulator, I thought: "Wow, this is a whole new world." At first I didn't know all the proper commands for getting on and changing channels. But it was easy to learn, and whenever I was really stuck, someone at the other end would help me.

The first few times you get on CB, you don't want to act like a hotshot and just butt in. You listen and say "hello" and usually people are pretty friendly—unless you're acting like a turkey. If you hang around and listen for too long without saying hello, though,


it's considered rude and others on the channel will call attention to you by saying, "Hello, Lurker."

People talk about all sorts of things on CB. Most of the time, it's nothing too serious, just chitchat. We discuss the latest games and talk about new computers.

We also trade stories—like after the final day of school last year there was a lot of talk about end-of-school-year pranks.

There are different CB channels for different interests. Channel 17 is supposed to be the kids' channel, but most kids like to roam among the adults. Channel One is an adult channel, and that's where I spend a lot of my time.

On CB, you never need to tell how old you are. And you can be yourself or your favorite character from a movie, comic strip, or a *Dungeons and Dragons* game. Once I got on CB and ran into someone with the handle Garfield. So I changed my handle to Odie and we "fought" like they do in the comic strip.

I usually tune in to CB for about three hours a week. I pop on at around eight in the evening, and see who's talking on different channels. My dad sets limits to how much time I can spend on CompuServe or I'd probably be on all night. Usually, he'll tell me to get off. Half an hour later, I'm still on. Then he'll yell, "All right, Davy, time's up." I keep typing for another half hour. Finally, he comes in and actually turns off the machine. whoops, here he is now ...gotta go. Over and out. 

DAVY PAYTON is 11 years old.

INTRODUCING PUZZLE MANIA. 7 GREAT PUZZLES CREATED BY US.

THE OTHERS BY PUZZLE MANIACS.



Puzzle Mania™ is a challenging jigsaw program for puzzle lovers. Puzzle Mania is also an inspired jigsaw program for puzzle creators. Because in addition to the seven great puzzles on the disk, you can create your own pictures on the screen, paint them in sixteen different colors and let the program turn them into puzzles to save on a separate disk.

Each Puzzle Mania puzzle (including your own creations) can be played on six levels of difficulty. There's help when you need it. And all turns are tallied. So you can turn the puzzle play into competitive play. If you have to part with a puzzle before it's finished, there's a stop-and-save feature built into the program, too.

Reader's Digest Software™ created Puzzle Mania for kids and their friends and their parents and their grandparents and everybody else who likes fun and games. Look for it at your software store or call Customer Service at 800/431-8800. (In NY, AK, HI: 914/241-5727.)

**SOFTWARE GOOD ENOUGH
TO GO OUT AND BUY A COMPUTER FOR.**

P E A D E R S D I G E S T

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ASK ENTER

BY DAVID B. POWELL

DRAGON'S LAIR AT HOME

DEAR ENTER: I have heard that ColecoVision is buying the rights to *Dragon's Lair*. Is this so? And will you need an RCA videodisc system to play it? —Casey Horton
Fullerton, CA

DEAR CASEY: Coleco announced its home version of *Dragon's Lair* in January at the Winter Consumer Electronics Show. Some time later this year, they promise, you will be able to play the arcade hit at home with either a ColecoVision cartridge or a datapack cassette for the Coleco Adam. A version on 5¼" diskette will also be available.

By the beginning of 1985, Coleco plans to introduce a videodisc version of the game and their own videodisc player for the Adam system. They haven't said yet whether it will be a laserdisc or a CED player.

THE MOST RAM

DEAR ENTER: What is the highest K RAM (Random Access Memory) in a home computer?

—Michael Dougherty
Philadelphia, PA

DEAR MICHAEL: Today, most home computers come with 64K RAM. That was unheard-of only a few years ago. And many home computers come with the ability to expand to 128K or even higher.

Which home computer can store the most information? Tech-



Is Dirk the Daring on his way to your house?

nically, there is no limit to the amount of central memory a computer can support. Besides, you can buy add-ons that will increase your machine's capacity. For example, the IBM PC comes with 64K and expansion slots that let you go up to 516K. Then you can buy additional expansion slots and other hardware and add even more memory.


Right now, if you want a computer that comes with more than 64K, you'll have to look at personal computers that were designed for business applications. The Compaq portable, for example, which is IBM-compatible, comes with 128K and is expandable to 640K.

COMPUTER LANGUAGES

DEAR ENTER: Do you know where I can get a book about the different computer languages?

—Annette Stueloten
San Jose, CA

DEAR ADRIENNE: The best book we know of on the subject is Volume II of *The Secret Guide to Computers* by Russ Walter. It covers over 30 programming languages and gives you side-by-side comparisons, showing what they look like. Unfortunately, you have to order this book by mail. Write to: Russ Walter, Suite #3, 92 St. Botolph Street, Boston, MA 02116. Enclose \$14 for each book (MA residents, add 5% sales tax).

If you want to learn about a particular language, take a look at a series called the *Allred Handy Guides*. The series includes booklets on APL, BASIC, Logo, Pascal, FORTRAN and COBOL, with descriptions and samples of programming. They are available in many bookstores, and cost about three dollars each. 

If you have a question about computers, just send it to: **ASK ENTER**, *ENTER Magazine*, CTW, 1 Lincoln Pl., NY, NY, 10023.

USER VIEWS

PLAYING TO LEARN

BY PHIL WISWELL AND
BERNIE DEKOVEN

The games people play have changed. At one time, it was enough simply to 'pong' a ball back and forth across the screen. Today, people are demanding more from their computer or VCS systems. They want to test their knowledge and learn new skills.

This issue, "User Views" looks at a cross-section of simulation, skill, music and art software. It's all software that's intended to teach and entertain you. We tried to keep those two goals in mind as we evaluated these programs. Did we learn anything? Was it enjoyable?

INTELLECTUAL DECATHLON

(Muse; Apple II+, \$14.48K disk, \$39.95)

"Conceptually fine, but the program could have been better."

—Bernie

"The best mental gymnastics I've seen."

—Phil

Intellectual Decathlon is a set of 10 separate games, or events that put your brain through its paces.

The games here range from "Numberstretch," a numerical version of the memory game Simon, to "Instant Replay," in which players decide whether or

not pictures are identical.

Our favorite game was "Abstractig," in which you have to re-construct an abstract picture from memory. Our least favorite was "Apple Derby," a needlessly complex horse race.

We noticed a few problems. The



software seems to take a long time to load, and it's hard to jump around easily from one game to another.

WRAP-UP

BERNIE: I thought that most of the activities were definitely classics of mental exertion.

PHIL: I loved the way these games challenged my wits. I didn't learn anything in particular, but playing this game was a lot of fun.

STATES & CAPITALS

(Atari; Atari computers; cassette, \$14.95)

"It did a very good job of teaching me something I wanted to know."

—Phil

"This is an excellent subject to learn this way."

—Bernie

States and Capitals will only keep score for one player, but two or three or more can play by voting on each answer. Although its graphics and effects fall short of state-of-the-art, *States and Capitals* really works because it is challenging. You'd be surprised how many people play the game because they think they know all 50 states and capitals.

There's no fast-paced excitement here, but the subject holds your interest.

To begin, the computer draws an outline of the U.S. border, then selects a state at random and draws in its outline. The player types in the name of the state, and, if correct, gains one point. Then a dot appears at the location



of the state capital and the player must type in that name. Players don't get a second chance, and unless the names are typed in with correct spelling, the computer will not accept them.

WRAP-UP

PHIL: I've stayed up nights playing this game over and over until I score 100 percent. Then I get up the next day and miss two or three!

BERNIE: Yes, but the game is three

(Continued from page 60)

NEWS BEAT

APPLE LAUNCHES MAC ATTACK



A '1984'-ish commercial introduced Apple's Macintosh computer (inset).

The Macintosh, Apple's new 32-bit personal computer, may be the first computer ever to stand at a podium and introduce itself to the world.

That's exactly what happened in January at Apple Computer Company's annual meeting in Cupertino, California. Steven Jobs, Apple's Chairman of the Board, carried the modest-looking 20-pound Macintosh onstage, placed it on the podium and plugged it in. After that, the

Macintosh—or Mac, as some call it—was on its own. As the audience watched, the Mac drew intricate pictures, generated charts, and printed a dazzling variety of type styles. It finished by using its synthesized voice to deliver a speech that brought the applauding audience to its feet.

The dramatic announcement is part of Apple's aggressive campaign to sell the Mac. That campaign includes the very unusual "1984" TV commercial

(see photo), in which Apple claims "1984 doesn't have to be like 1984" because the Mac is so user-friendly.

Indeed, this computer does offer some very user-friendly features. The Mac is designed to function as an electronic desktop for office workers and students. It comes complete with built-in software that functions as electronic files, papers, pencils, scissors and paste. Like its big sister, the Lisa, Mac comes with an electronic pointer called a mouse. By pointing the mouse at pictures (or symbols) on the screen, you can get the computer to do just about anything without touching the keyboard.

The Mac also features an extremely sharp 9" black and white monitor. Its screen has a high-resolution 175,104 pixel display. With the combination of this display quality and the available Mac Paint software, it looks like the Mac will offer graphics capabilities far beyond anything in its \$2495 price range.

Other features include a 3½" disk (most floppy disks are 5¼"), 128K RAM, and a built-in speech synthesizer. Will the Macintosh be the success that Apple is hoping for? Only time will tell. But at first glance, it looks like other computer companies better prepare for a Mac attack.

—Susan Meyers

DATABAR: You know those zebra-striped bar codes they put on everything from soda cans to computer magazines? Well, there's a new product that uses

SHOW BEAT

'STARFIGHTER': HI-RES OR REAL?



The Last Starfighter turns video game player Alex Rogan (played by Lance Guest, center on ramp) into an interplanetary warrior.

When a movie company spends millions of dollars to produce the best computer graphics animation sequences ever seen, the last thing you expect the film's director to say is "We're hoping no one even notices."

But that's just the way director Nick Castle, Jr. feels about the effects in his film, *The Last Starfighter*. *Starfighter*, due out this summer, is the story of a boy who finds himself recruited as a top fighter in an intergalactic war. Why him? Because he's a champ at a certain arcade video game.

The story may be fun, but it's the effects that have computer fans excited. **Digital Productions** (a Los Angeles-based computer graphics company) and a Cray supercomputer are

responsible for all the tech magic. Director Castle and the technicians at Digital are hoping that the high resolution graphics (representing space ships, star fields, planet terrain and even people) will be so good that you won't notice they aren't real objects.

"Nothing of this magnitude has ever been done on a computer before," claims Castle. The "photo-real" sequences will take up 20 minutes of movie time.

With the high-tech highlights Digital has in store for *Starfighter*, lead character Alex Rogan will have quite a backdrop for his adventure gaming.

"Alex is a video game whiz," explains Catherine Mary Stewart, who plays Alex's girlfriend Maggie. "It's the summer after our high school graduation. Alex is con-

fused about the future and takes out his frustration on the game, continually trying to beat his own score. He takes it very seriously."

Does Alex (played by Lance Guest) take the *Starfighter* challenge? Does Maggie get left behind? You'll have to see the movie to find out. But rumor has it that there are enough unanswered questions at the end of *Starfighter* to leave room for a sequel. The possibilities are out of this world.

—Patricia Berry

MUSIC NOTES: By late spring, you may be able to buy a record album and software for your Atari computer—all in one package! English rocker **Pete Shelley** is the mastermind of this record-computer connection. Last year, his British album *XL 1* was made with a special groove in the record. You could insert your stereo needle into the groove and tape-record computer tones. Then those tones were input into a personal computer, the Sinclair ZX81. The computer would print song lyrics and graphics on its monitor as the record played on your stereo!

Pete's upcoming American album on Elektra Records is produced by **Martin Rushent**, who helped **Human League** on their first album, *Dare*. The computer graphics that accompany Pete's lyrics are his own.

Not surprisingly, Pete's been a hacker since 1971, when a time-sharing terminal was installed in his Manchester grade school.

"Music and computers have been playing leap frog in my life,"

says Pete. "But in the last three years—since I bought my own computer—I've been able to combine the two disciplines." And someday soon, Americans may get a chance to hear—and see—how

THEATER TRENDS: Take Renaissance artist/inventor/philosopher Leonardo da Vinci, give him a vocoder and a computer and put him in real-time. What do you get? Playwright Kenneth Robins calls it **Lenny and the Heartbreakers**, a musical that gave us a hint of what theater might be like in the not-so-distant future. Very loosely based on the life of the great da Vinci, the play/opera ran for a few weeks in a New York City theater last winter. It combined digitized backdrops of Mona Lisa and *The Last Supper* with a completely synthesized musical score. Some critics raved; others ragged. But none could deny it was a theater tech high. Could this be the shape of theater to come?



Lenny: Theater goes high-tech.

MOVIE NEWS: What happens when a computer that's programmed to write love poetry for its owner's girlfriend starts to fancy the woman, too? The results

aren't exactly user-friendly! MGM/UA's light-hearted movie **Electric Dreams** puts this love triangle online. Providing the film with digitized, and no doubt danceable, musical interludes will be **Boy George** and **Culture Club** and the **Electric Light Orchestra**. Music Video director Steve Barron will make his feature film debut with this movie, due out this fall. Ten years after Discovery I astronaut David Bowman is lost in space near Jupiter, a rescue mission is sent to find him. But will the Russians get there first? That's the plot of **2010: Odyssey Two**, the sequel to 1968's classic computer/science fiction film **2001: A Space Odyssey**. Filming has already begun on this **Arthur C. Clarke** space adventure, which stars John Lithgow (*Twilight Zone*) and Roy Scheider (*Jaws*, *Blue Thunder*). Heading the special effects crew is **Richard Edlund**, who also worked on **Return of the Jedi** and **Star Wars**. Look for **2010** next Christmas.

BEAT BIT: It's called a drum synth, a beat box, and a drum machine, but the common denominator is that this electronic rhythm-maker—the **LinnDrum** machine—gets its original drum sound from a real drummer. Studio musician **Steve Gadd**, who has played on albums for **Carly Simon** and **Steely Dan**, is the drummer who created the original rhythm for the LinnDrum. Steve set the beat for the Linn's 16 "voices," including cymbals, snares and basses. Can you beat that?

CELEBRITY BITS: The arresting lead singer of **The Police**, Sting, has been a very busy bee. Besides touring with his band, Sting spent summer vacation playing

the villain Feyd in **Dune**, the film adaptation of the best-selling science fiction novel of all time. And during another concert break, he



Costumed for Dune, Sting alternates rocking role with acting.

was off to California to create a computerized symphony. When the cute but raspy-voiced alien star of **E.T.** spoke, Elliot and just about everyone else listened. But did you recognize the voice? Probably not. The fact is, director **Steven Spielberg** called on the help of his pal, cute but raspy-voiced actress **Debra Winger**, to dub in such famous lines as "E.T. phone home" and "Eli-i-ot." Debra's and another voice were electronically mixed together for the final take. Debra's favorite line? "Owww-ch."

ELECTRONIC ELEMENT: **Earth, Wind and Fire**—known for 10 years as a heavily orchestrated rhythm and blues band—has abandoned brass horns and stringed instruments for synthesizers and drum machines. Their new LP on Columbia records, **Electric Universe**, is the highest in high-tech music. Says band leader Maurice White: "Music is a reflection of the computer age we live in." When in Silicon Valley, swing with the microchips.

PACESETTERS

ELECTRONIC ENTREPRENEURS



Adam, Mark and Chris in the garage where they invented an IBM-PC part.

Eighteen-year-old Mark Juliana and his neighbors Adam Hogin, 17, and Chris Hogin, 14, were just looking for a way to upgrade the memory on Mark's family IBM-PC. But when they got to work, these three San Jose, California, hackers realized that they had created a marketable product. "We thought, 'Wow, if what we've developed is so useful to us, then other PC owners will be interested in it, too,'" Mark remembers.

Mark, Adam and Chris call their invention the "Expansion Kit." It enables IBM-PC owners to add extra memory and peripherals to their computers by doubling the

number of expansion slots on the PC (Expansion slots are the places where components like the disk drive, monitor, printer, game controllers and extra memory plug in.)

The boys formed a company to sell their product, and named it TAMAC (The Adam Mark and Chris) Electronics. TAMAC operates out of Mark's garage in San Jose. The teenagers buy all their parts wholesale from manufacturers. "At first, it was kind of funny because manufacturers were real curious," Mark recalls. "They just couldn't understand why three kids would want all these parts. They still always make us pay up before they'll fill

our order. I guess since we're young, they're afraid we might not have the money."

Once all the components are gathered, the boys assemble the kits. "Each one takes about 10 minutes," says Mark. "We usually work together and produce a lot at one time, then stock them. We keep track of our inventory, expenses and profits on my family's IBM."

The Expansion Kit costs \$14.95 and is sold mostly by mail order. "It's about a 45 percent profit for us," Mark notes. "So far as we know, everybody has been happy with it." The only error they've heard of was a typo in the instruction manual. "That's been corrected."

TAMAC has sold around 1000 kits so far—a slight disappointment, because, explains Mark, "We thought we'd be living off our capital by now. I mean, we expected to make at least our first half a million." But Mark, Adam and Chris are optimistic: "We've only just begun—we're working on new inventions right now."

Leader of the NAK

Peter Fishman, 14, is president of an Apple Users Group that's especially for kids. It's called Newton Apple Kids (NAK) and it boasts more than 100 members, most of whom are under the age of 18.

This spring, under Peter's guidance, NAK will be incorporated under the new title of Computer Kids Incorporated.

Peter has high expectations for the group. "We're hoping to have chapters all over the country," he says. "In addition to the Newton Apple Kids here in Massachusetts, we already know that there will be a Syracuse Apple Users Group in New York, and one in Texas. It's very exciting."

Peter and his fellow club members have also been working on a NAK electronic bulletin board. It will be called The sNAK Bar and should be underway by April. "We're interested in reaching outside the club," says Peter, "and the sNAK Bar is one way to do that. It will be open 7-9:00 most evenings and anyone with a modem can post messages."

Joystick Executive

Tammy Sue Stewart's hand was the inspiration for a new product called the Video Rack—a plastic joystick holder that's designed to give your hand support during long hours of playing. Now the 14-year-old from La Center, Minnesota, is president of the company that makes the Video Rack. The company even bears her name, Tammy Sue Distributors.

Tammy Sue gives her Dad most of the credit for the Video Rack. It was his invention, she says. But it was her firm hands that gave him the idea. "We had just gotten an Atari computer and Dad noticed that after we'd been playing lots of games, we were always rubbing the hand that held the joystick."

So far, Tammy Sue Distributing has received orders from stores all over the country. "We charge \$10.95 for each one and make about \$3 on each sale," says the company president.

We'd say she's got quite a rack-et.

The Hacker Actor of 'Whiz Kids'

Did you know that Jeffrey Jacquet, who plays Jeremy in CBS's *Whiz Kids*, is a real-life hacker? Well, he is, and he's currently co-writing an adventure game that he



Jeffrey Jacquet: Life imitates art.

hopes to be able to show computer companies by summertime. "So far," says Jeffrey, 17, "the game revolves too much around luck. We need to make it more of a game of skill. Once that bug's out, we'll be ready to go."

Jeffrey's role in *Whiz Kids* played a major part in converting him into the real-life hacker he is today. "As soon as I started preparing for the part, I just wanted to go into more depth with computers." Now he finds that they play a big role in his life. "There's always something new that you can do on a computer. I write all sorts of programs, I never have a chance to be bored anymore."

Video Pro

Tim Collum of Boyt, Texas, is 1983's "Video Player of the Year." The 21-year-old was crowned

champ on January 14th by the Twin Galaxies International Scoreboard of Ottumwa, Iowa, a service that keeps track of the world's highest video game scores. Tim's prizes included \$250 cash and what's described as a "designer video game player uniform."

Tim says that it's not the money that makes winning the "Player of the Year" award special to him. "It's being the best. That's what I was really working for, and it's paid off."

NIBBLES: Junior Maestro Zoe Mulford has written an entire computerized symphony! The 15-year-old from Delaware used a \$70,000 Synclavier II synthesizer to write her masterpiece, entitled "Uncommon Times"... Ever play Human Engineering Software's home video game "Attack of the Mutant Camels"? Fourteen-year-old Soren Kaplan played and won. His score of 117,522 got him a free trip for two to the Camelback Resort in Arizona.

Are You a Pacesetter?

Every month, ENTER's "Pacesetters" will look at kids who are doing exciting things with computers or high technology. If you—or anyone you know—are doing something interesting with computers, robots, lasers, holography, or any other high-tech field, tell us about it. Write a couple of paragraphs describing the project. Include your name, address and phone number (and a photo, if appropriate), and send it to: Pacesetters, ENTER, 1 Lincoln Plaza, New York, NY 10023. If we write up your story, we'll send you an ENTER t-shirt. ☐

CONNECTIONS

Apple Source

If you're a regular user of an Apple computer, you should know about the Apple Computer Clubs. These clubs can hook you up with a local Apple user group or help you start your own. They can even link you up with Apple Users in 19 countries!

While Apple clubs can be of interest to home users, they are mainly aimed at school groups. If you're using an Apple at school and there's no group there, you might want to suggest starting one. The Apple Computer Club's central office will sell your group an organization kit to help you get started. The kit contains a slew of information, including a hefty manual, posters and booklets.

The manual gives tips on club organization, lists helpful articles and books, and offers fund-raising suggestions. It also provides interesting stories about people doing unusual things with their Apples...like the Illinois man who uses his Apple to control a lawnmowing robot.

For more information about Apple Computer Clubs, write them at P.O. Box 948, Lowell, MA 01853. You can also call (617) 459-7181.

Calling All Robot Builders

Is your ambition in life to be a world-famous robot builder? Then we've got the perfect showcase for you. The First National Robotics Championship Contest will take



Sir Plus, the leftover robot.

place on June 15 and 16 at the Science Museum and Planetarium of Palm Beach County, Florida. The contest is open to all high school students (junior high is fine, too), and prizes of over \$1000 will be awarded in three categories.

Robots of all sizes, shapes and abilities are eligible. "Judging will be based on originality of design, quality of workmanship, and esthetics," the museum says.

The contest will be hosted by the science museum's recycled robot, Sir Plus. To be eligible for the contest, you must register by June 1, 1984. (There is a deposit of \$25—which will be refunded—

required.) For more information, write: Science Museum and Planetarium, 4801 Dreher Trail North, W. Palm Beach, FL 33405.

Commodore Software

You've got a Commodore computer and you're tired of spending a lot of money to get a decent mixture of software. Well, take heart. "Public Domain, Inc." is a software library service written by Commodore users for Commodore users. For only \$10, you can get a disk or tape that contains 35 to 45 programs.

Extensive collections of software are available for the VIC-20, Commodore 64 and PET. Each collection includes a bundle of games and educational programs.

To start, send for the free Public Domain Catalogue. This booklet, which has the finest print we've ever seen, lists hundreds of programs. Depending on your Commodore system, you can choose disks containing Eliza, an electronic shrink program; Marblestat, a random probability demo; Jotto, a Mastermind-type word game; and Niche, in which you control ecological variables.

For more information, or a copy of the catalogue, write to Public Domain, Inc., 5025 S. Rangeline Rd., West Milton, OH 45383, or call 513/698-5638 (The call is not free).

—Susan Jernin

To list news, contests or resources in "Connections," send them to: Lisings, ENTER, 1 Lincoln Pl., New York, NY 10023.



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Agent U.S.A., Hammercatch!, Spelldiver designed and developed by Tom Sawyer Productions, Inc. Available for Atari and Commodore 64 computers. Apple and IBM versions available soon.

***H**OW TO SUCCEED IN BUSINESS...*

*...WITH A LITTLE HELP
FROM YOUR COMPUTER*





M

aking money with
your computer is
more than just a
job—it's a way to

earn and learn at the same time. And whether you've worked with the computer for a while, or have just gotten started, there are computer jobs out there that can pay off with money and experience.

We know it's hard work getting almost any summer or after-school job. So ENTER has searched the country for money-making job ideas. Some require more computer knowledge than others, but many of the jobs can be handled by even the novice computer user. On the next three pages, you'll find a "Hacker's Dozen" of job ideas. All of them are based on the real-life experiences of teenagers who've had hands-on success building both computer know-how and their bank accounts.

We've taken a hard look at what you need to make money with your computer. But we know that you'll probably think of many other ways that you can use a computer to earn extra money. We'd love to hear your ideas and share them with other readers. Write to "Earn & Learn," ENTER, 1 Lincoln Plaza, N.Y., NY 10023.

Bookkeeping for a belly dancer? Creating unicorns for a computer company? There's no limit to what a computer job can be.

1

TUTORING

Tutoring can be a great way to earn money. Jeremy Holland, 17, works with the Texas Instrument Learning Center in San Francisco, California. He has tutored students, adults and users groups, and will work with about 2000 computer campers this summer. "Jeremy knows more about technical questions than anyone else," says Sioux Thompson, Jeremy's supervisor at Learning Center. "We send people to him when they have complicated questions."

2

WORD PROCESSING

Typing reports, papers and resumes was a way to make extra cash even before computers were invented. A word processing program, a good printer and some fast fingers add a new dimension to this time-tested job. You still have to enter the information, but most word processing programs let you make changes and corrections at the touch of a button. Chris Thatcher, 14, worked for her junior high school in Palo Alto, California. She worked at home, word processing schedules and letters for a \$3.50 an hour fee. Recently she even got paid to type her neighbor's diary.



3

CLERICAL JOBS

Working in a stock room or filing papers for a company that uses computers may not sound glamorous. But these clerical jobs are often a good way to get started. Craig and Keith Mortensen, 17-year-old California twins (featured in our February, 1984, cover story) began their computer careers three years ago at the Apple Education Foundation. They did data entry, typed letters, and occasionally set up hardware. "The job had a lot of advantages," said Keith. "We met important people, had flexible hours, and got paid pretty well."

"The worst part," Craig remembers, "was that my fingers hurt from all that typing."

Before long, the Mortensen's computer graphic abilities came to the company's attention. Now, they're computer graphic consultants to Apple and other computer companies.

4

MAILING LISTS

When Leland Levy needed a computer assistant for the Palo Alto city councilman race, he turned to his 17-year-old son, Jonathan. Jonathan used his programming knowledge to help organize an electronic mailing list so his father could pinpoint specific groups of interested voters. Jonathan's program also helped organize information about phone numbers, addresses, and voters' special concerns. Jonathan and his dad are both pleased with their partnership. "My father was getting ideas in the middle of the night," says Jonathan. "So it was easy for us to run downstairs and add more information in our Apple II."

5

USERS GUIDE

If you've been working with computers for a while, you might try writing a user guide. Stephen Cohen, 16, of Denver, Colorado, was one of the first students in his school to learn FORTH, a powerful computer language that's not as widely used as BASIC. "I found that all the books on FORTH were either too hard or too easy so I wrote my own," explains Stephen. Not only is his 106-page manual the textbook for his class, but Atari says they are "very inter-



ou really don't have to be a computer pro to make extra money with your computer....Even new users are finding ways to earn.

ested" in publishing it. If his manual is published, Stephen will receive royalties based on the number of copies sold. "At times it was a pain to write," says Stephen, "but I'm glad I did it."

6

BOOKKEEPING/ACCOUNTING

Sometimes the best ways to make money with computers can sound pretty strange. "When I was in high school I did bookkeeping for a belly dancer," laughs Lisa Van Stone, now a senior at Princeton University. "I just thought of the belly dancer like I would any other client."

Lisa also wrote software that kept track of financial records for business clients. She even did a bookkeeping program for her mother. Writing this kind of software program "is one of the most useful ways to make money," says Lisa. "Anytime you pick up business skills, they'll be useful to you later."

7

COMPUTER GRAPHICS

Even if you've just started programming, you have probably tried "painting pictures" at the computer keyboard. Once you've been at this for a while, you might be able to interest local companies or stores in your work. They might need a clever



computer-created picture to include in a slide presentation, or a pixel-perfect logo for their advertising.

Carl Gnmm has had success with her computer artwork. This 14-year-old Californian from "Silicon Valley" has sold many of her creations to The Learning Company, a maker of educational software. Carl's unicorns, monsters, and skeletons have appeared in such games as *Magic Spells* and *Maptown*.

8

CONTESTS

And the winner is... Tim Huckabay. While Tim and other contest entrants can't always count on winning, programming contests can be a rewarding challenge. Tim, for example, has won prizes in the Denver Public School Programming Contest and in the Colorado State University Math Day Mathesis Competition. Right now, this 18-year-old is waiting to hear from the National Westinghouse Competition where

he has the chance to win a college scholarship. "I enter these contests for fun," says Tim, "but you do have a chance to make money." Check ENTER's Connections column for news about other contests.

9

TESTING

Paul Hook, 17, of San Rafael, California, makes his extra spending money as a tester for the Broderbund Software Company. "I look for programming bugs like errors in character movement and misspelled words," says Paul. Broderbund hires testers who are 14 or older and "really into gaming." These testers rate programs on their overall value, graphic quality and creativity.

Don't expect testing to be all fun and games. Depending on the complexity of the software, testers work daily on a program for three hours over one to two weeks. It can be exhausting. "Some days," says Paul, "I'm so tired because there is so much to do."

10

WRITING

Just about everybody wants to read about what's hot in new technology. Articles that include programming tips, software and hardware reviews

To begin your own search for a computer job, learn all you can about the company or store where you want to work.

and other new tech news are very popular. You probably won't sell an article to a major newspaper right away, but you can get started by writing for your school newspaper. Once you've shown you have the "write stuff," weekly and perhaps even daily newspapers just might be interested in printing your efforts.

Vid Kid writer Rawson Stovall, 11, started small when he began writing a column for the *Arlene* (Texas) *Reporter News* in 1981. Today, his syndicated column of news and reviews appears in about 100 newspapers across the country.

11 PROGRAMMING

Although programming is very difficult to do well, it's one of the most common computer jobs. Norman Eroymsan, 19, of New York, wrote a TRS-80 program to teach Hebrew. His program is now being used at the Institution for Computers in Jewish Life.

Programming can start at home. Stephen Cohen, 16, the creator of the FORTH manual, also got paid by his mother to write a stock market program. His mother enters data from the *Wall Street Journal* and the software organizes the information. "Every time I remind my mother how much money she has made with the software," says Stephen, "She reminds me that the software just organizes data—she's still got to do all the analyzing."



12 TROUBLESHOOTING

Know of a company with hardware hassles?

Chuck Tucker did. Chuck, 18, of Denver, Colorado, was a troubleshooter for Atari on their PASCAL system. The system was very user-unfriendly at first, Chuck explains. So he used his computer skills to simplify the system's editor, compiler and driver.

Chuck began developing these skills while he was still in junior high school. He started by writing programs that organized data for a nearby medical center.

HOW TO GET STARTED


Whether you're helping one person set up a computerized filing system or teaching other students how to use their computers, your job hunt is likely to begin in what may seem an unlikely place—

at your local library.

If you'd like to work with a company or a store that uses computers, check the reference section of the library for resources like *Data Sources: Hardware/Software* (published quarterly by Ziff-Davis) and the *Encyclopedia of Information Systems and Services* (Gale Books, 1982).

You can also check the Yellow Pages of your telephone book. These sources provide phone numbers and addresses of computer-related companies, some of which may be located in your area. Once you've got that information, call or write to the company's personnel or community relations office. Find out if they offer internships or have specific summer or after-school jobs for young people. (For more information about computer store jobs, see the following story.)

While letters and phone calls can work, meeting people face-to-face is the best way to land a computer job. As a young person, you might have difficulty getting an interview. But if computer conferences or career day fairs are being held in your area, you will probably be able to meet people there who can tell you about possible internships or part-time job possibilities. Keep an eye on conference announcements in computer magazines and career day listing in your school's guidance office or on the bulletin board.

And remember, keep trying and you can land that computer job. Good luck! 

Material for this piece contributed by JoAnn Greco, Susan Jamill, Dawn Gordon and Ron Legro.

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For Ages 10 to 16

Computer stores have become the "hangout of the '80s," says one store owner. Everybody wants to be around what's hot and new.



COMPUTER SALES PITCH

HOW TO GET—AND KEEP—A JOB IN A COMPUTER STORE

Imagine being surrounded by computers. Keyboards to the right of you, monitors to the left, software stacked against each wall and peripherals on every side. No, this isn't a dream. You've just entered...the computer store.

The idea of being surrounded by the very latest computer equipment attracts many people to these stores. "They have become the hangout of the '80s," says Allan Unger, manager of the Computers Unlimited store in Milwaukee, Wisconsin.

It's not surprising, then, that many young job seekers hope to be hired for after school or summer work at their local computer store. But with all the competition, it can be tough to land one of these jobs. To help, ENTER talked with people from around the country who run com-

puter stores, and with young computer store workers. We asked about their experiences and picked up tips on how to get—and keep—that computer store job.

How much do you have to know about computers to work in a computer store?

You don't have to know everything about every machine, according to Sandy Meyerson, owner of the Software Solutions store in Ormond, Florida. But you have to be willing to learn.

"Exposure to computers and knowledge about what they can do is important," says Sandy. But you don't have to be a round-the-clock hacker, she stresses. You can learn a lot about computer systems by reading magazines and books, working on computers at home and school, and talking with people who already work in computer stores.

"I used to show up [at the local

computer store] every day after school and talk with the sales people," says 15-year-old Jonathan Teiler of New York City. His interest paid off: When a job came open, Jonathan was hired.

Besides computer knowledge, what else do computer stores want from their sales people?

"We look for people who are good with customers, and who try to be helpful," says Sue Duchak of Sears. Sears, which has computer departments in many of its stores, requires references (from teachers, relatives or others) and conducts personal interviews with all applicants.

Through these interviews and references, Sears tries to determine whether the applicant can deal with tough situations, says Duchak. When six customers are asking nine questions about four different machines, store owners want to know their sales people are up to this



You don't have to know everything about every computer to work in a computer store...But you do have to be willing to learn.

difficult challenge.

"Responsibility is also important," according to Chuck Brody, assistant manager of the Program Store in Falls Church, Virginia. "We look for people who want to sell and who want to keep the store looking good," says Brody. And, of course, store owners want workers who show up on time and ready to work

What does it take to be a good sales person?

Knowing how well software and hardware work is very important, says Tom Pearl, 17, who works at the Program Store in Washington, D.C. But, he adds, you have to give customers something more. "Successful sales people are ones who tell the truth to customers. If a program doesn't work well, tell them. It's important to form a lasting relationship," he explains. "Customers appreciate honesty and they'll come back again."

"Patience is also very important," says Sandy Meyerson of Softbyte Solutions. After the computer is sold, she points out, it's important that sales people are willing to help new computer owners get started.

Any good sales person must be able to ask as well as answer questions, says 16-year-old Todd Wiener. Todd, who works at the World of Computers in Port Chester, New York, says you have to ask questions to figure out what people want from their computer.

Not every computer is right for everybody, he explains. "What I do, basically, is help people select the computer system [and software] that best fits their needs."



What are the advantages and disadvantages to being a young computer sales person?

Being young can give you a special advantage when selling to young customers. Since a lot of purchases are made by teenagers, it really can help.

"The kids relate to me because I understand what they want," says Jonathan Teller. "I've used most of the software they're interested in."

But Todd Wiener and others admit that being young can also have its drawbacks—particularly when you're trying to sell expensive hardware to an older person.

"Business systems can end up costing thousands of dollars," says Todd. "Some people just feel more comfortable with someone closer to their own age."

Customers aren't the only ones who may be put off by young sales people. Older store workers may have trouble accepting you at first.

"Half of the salesmen liked me and thought I was doing well," says Brett Schulte, 15, who worked at a computer store in Wisconsin. "The other half resented me because I was so young."

To avoid these problems, some computer stores have established strict age limits for employees. The

Program Store, for example, insists that all its workers are at least 16 years old. Sears sets its age limit according to the individual state laws. Check with the manager at your local computer store to find out its policy about hiring young people.

If a computer store wanted to hire me to do odd jobs rather than to sell computers, should I turn them down?

Probably not. Starting small can be the best way to learn how a store operates and to find out about the computers it sells.

When 14-year-old Tom Pearl started working at the Program Store in Washington, D.C. three years ago, he washed windows and helped in the stockroom. After hours, the manager let him spend time trying out programs and working on different machines. Before long, he was offered a sales job. And today, at 17, Tom is senior sales person in the D.C. store.

Will I become a computer whiz kid if I work in a computer store?

You'll almost certainly learn a lot about computers. But you're also likely to learn something even more important.

"It's funny, but I think I learned more about people than I did about computers," says 16-year-old Josh Doennis, a salesman at the Computer Center in New York. "You have to take a different attitude with each person you deal with. Some are very easy to talk to, and others won't let you get a word in edgewise... Eventually I began to understand the different personalities and everything fell into place."

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It started as a school project. But after more than a year of work, Eric Babinet, 16, was able to sell his game to a computer company.



DIARY OF A GAME DESIGNER

BY BILL CAMARDA AND ERIC BABINET



Eric Babinet's ninth-grade independent study computer project turned into Star

Crystals, an arcade-style adventure game produced and sold by Program Design Inc.

In the two years since he bought an Atan 800, Eric, 16, has learned a great deal about programming, and how ideas can become reality in the computer business. Eric talked with ENTER's Bill Camarda about his experience creating and selling a game. Here, in diary form, is the story of how Eric went from beginner to pro.

MARCH 1982

Some of us were going to put together a robot for our class project, but it turns out that it's just too expensive. I have a new computer, maybe I can make up a computer game. It would be fun to try, and I have a few simple ideas that might work.

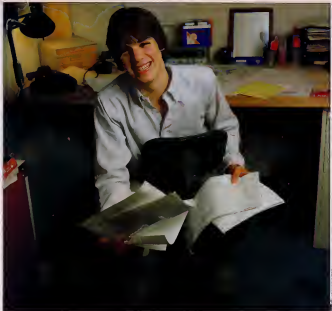
Doing it right won't be easy. I haven't done much with computers since I looked around with them some in the fifth grade. And I can already see that if the game's going to be any good, I'll have to spend Easter vacation learning Assembly language, which is faster than BASIC but a lot more complex.

APRIL 1982

After many false starts at working with Assembly language, I've got the bare bones of my game in the computer. I like the game. Maybe I could even sell it. But to do that, I'll have to make it more sophisticated.

I looked at some arcade games and I've been trying to add some of their features—like faster action and bonus points. The game is getting a lot better.

I'm learning as I go. Some simple-looking things, like keeping score, aren't simple at all. Whenever the player shoots something, the program has to check how much to add, go through the complicated



PHOTOGRAPH BY JEFFREY M. HARRIS

computations, and then display it on the screen. That takes a lot of work on the computer. I've been picking up on routines like that from magazines.

MAY 1982

My game keeps changing. At first, I wanted two players to be able to play at once. Then I found out that it's easier to sell a game if people either can play alone or take turns. So I changed the game.

Unfortunately, no one I know has any experience with game designing, and I've been forced to do all the learning on my own. Some of my friends are interested in computers now, but none of them

program. They are interested in my game but don't really understand what the programming involves.

Now my program has an annoying bug—sometimes the screen flickers. I can't figure out why.

The experience I've had—and, I'll bet, most programmers have had—is that you spend 80 percent of your time debugging a program. Programming is really just solving a series of problems. When some people come across a problem, they say, "Oh, a problem. Get someone else in here to solve it." But I like to solve it myself.

JUNE 1982

My brother's math teacher

told me about a company here in Greenwich, Connecticut called Program Design, Inc. (P.D.I.) that sells educational software. He said I'd have nothing to lose if I showed them my game. I called, and much to my surprise I ended up talking directly with the company's president, John Victor. He said that they'd never specialized in games, but they'd been thinking about trying to sell some more. He also said he'd be glad to see me. So I went and showed him what I'd done so far.

It was very exciting. Mr. Victor and others liked my game, and could see its potential. However, we felt more work should be done before it is ready to market. We agreed that I



*Even if I don't make money, designing a game is great experience.
...But don't get me wrong—I'd like to make some money, too."*

would work on it all summer and give P.D.I. a finished product in September. They'll give me a \$500 advance and 15 percent of the money they get on the first 2000 games they sell. Then I'll get 20 percent on the rest—if it sells that many. Even if I don't make much money, this is a great experience. But don't get me wrong—I'd like to make some money, too.

Meanwhile, I found the flicker bug. Sixty times a second, the computer has to display a new picture. So it spends a lot of time working on that. You can use part of the time left over—it's called the "vertical blank"—to do other things. But if you ask the program to do too much, it won't finish in time to show the next picture. So it flickers.

I had to do a major reorganization of the program to stop this problem. It took two weeks, but it's done now and I feel pretty good about it.

One important thing I've learned about computer games: first you design the computer part of the game; then you create a story that blends with the graphics and game play. I finally wrote the story to go with my game: "The Earth is suffering from a severe energy crisis... On the distant planet Croga, scientists found crystals with an amazing property: the crystals capture and greatly amplify solar energy... The Crogans, unwilling to part with the crystals, have hidden them deep beneath Croga's surface. Intricate defense systems have been built... Earth's international government, the Earth Federation, has assembled an elite corp of space troopers to travel to



Croga and capture the crystals."

Obviously, the game won't be done by the end of school. This is taking much longer than I originally thought. So I gave a presentation in school on what I had completed. The game has become much more than a school project.

JULY 1982

Oh, no! P.D.I. has changed its mind and decided not to sell my game. P.D.I. prepared a letter of agreement, but my lawyer felt it didn't include everything it should. For instance, P.D.I. was supposed to provide a disk drive to help me finish.

So, my lawyer wrote up a new contract. We didn't change much, but someone at P.D.I. got the jitters. It's upsetting, but I can understand their point of view. Selling a game is a big commitment and involves taking a big risk. I'm not too worried, though. First I'll finish the game, then I'll find someone to sell it.

AUGUST 1982

I took August off to go on vacation with my family. I left the computer at home. All I did was decide on a name for the game, *Star Crystals*.

And that only took a day.

When I'm at home, I don't just sit in front of a computer day and night like some people. I couldn't stand that. I'm very active in bicycling and sports. Taking a vacation was a good idea—I needed some time away from the computer.

SEPTEMBER 1982

Programming is like speaking a foreign language. You stop a while and come back a bit rusty, but pick it up again quickly. It felt odd coming back to my game after a month away. But I got comfortable again in a few days.

I wrote to some big software companies and one of them sent me an author's guide explaining exactly what they're looking for. They were pretty clear on how they wanted the documentation—the program instructions—done. They also sent me a nondisclosure agreement, which insures that they won't reject my game and then steal my ideas.

NOVEMBER 1982

Bad news. None of the big companies I tried were interested in *Star Crystals*. I'm very disappointed but not ready to quit. Maybe I'll try P.D.I. again. I've improved the game since they last saw it. Maybe they've gotten over their jitters.

DECEMBER 1982

After meeting with P.D.I. once again, they decided to accept it. We signed a contract, so it's definite. I'll

This is great. My game is being manufactured now....And they're using my age to sell the game. For once, I'm glad I'm not older."

get what they were offering me in the first place. They decided the improved game was worth the investment. I'm putting some finishing touches on the game—adding music at the beginning and better graphics in some places. I'm also adding a "protection scheme," so people can't make free copies.

JANUARY 1983

This is great. P.D.I. has an artist drawing the cover and they're editing my game manual. Disks and cassettes are being manufactured now.

They're using my age as a way to publicize the game. For once, I'm glad I'm not older..

I just discovered a book has been published containing many programming tips and secrets for the Altan. It figures that they came out with it after I had discovered most of them.

JUNE 1983

The game is out and selling now...It's not doing as well as I'd like, but I still get a royalty check every month and that's satisfying. I'm not going to stop here, either. I'm working with a graphic designer in New York on a game. However, I'm going to be entering high school and won't have as much free time to work on programming. That's frustrating.

JULY 1983

I'm beginning to understand the problems of selling a game. I'd like



Star Crystals' first screen.

P.D.I. to promote Star Crystals more, but when I asked the company president about that, he told me how much it can cost to do a lot of advertising. It made me appreciate more what P.D.I. has done. They're being fair. They have their own interests at heart, but they seem to care about mine.

Looking back, I'd say Star Crystals is better than 60 or 70 percent of the games on the market. It's not the best in the world, but it's not bad for the first time.

What would I change? For one thing, I would let the player win, instead of just constantly repeating the hardest screen at the game's highest level. Then, the game would still be tough to beat, but players would get a reward. If a player gets that far, they really deserve to win. (Actually, I've never made it through all six boards myself.) I would also work on developing more complex and creative graphics. That would add to the game.

From now on, I'll have a better idea how I want a game to look before I do any programming. The design stage is extremely important. You can have a game that has a simple concept but is still challenging, rewarding—and popular. On the other hand, I've

seen complicated games, where the programmer worked very hard, that are still boring.

Everybody in the computer industry can program, but it's coming up with the ideas and then expressing them through the program that's the hard part.

DECEMBER 1983

My game has run into some bad luck. P.D.I. is going to sell off the remaining copies of Star Crystals, but won't be ordering more.

I feel badly about it. But I'm also pleased about having gone through this whole process. What I've learned is much more rewarding than the money. The knowledge and experience will never be lost. I was very shy when all this started, but working with the people at P.D.I. and with the graphic designer in New York has helped me overcome this shyness.

What will I do now? Concentrate on school. The computer industry is so competitive that it is necessary to focus your full attention on it if you want to succeed. This is my junior year in high school and I'm looking forward to discovering new interests.

I like computers, and will probably work with them someday because they're everywhere. But I'm learning that there are a lot of other interesting things in life. I'm young. There's time to think about what to do next.

Q

BILL CAMARDA, a freelance writer, wrote "Buying the Right Computer" in *ENTER's* premiere issue.



At 15, Kay Borzsony learned how hard the computer business can be. His pockets may be empty, but he's filled with second thoughts.



SOFTWARE SUCCESS

IT'S HARDER THAN IT LOOKS...JUST ASK KAY BORZSONY

BY STEVE SLON



It seems that every time you turn around, you hear another computer success story. Here's an 18-year-old who sold an idea to a major video

game company and made a pile of money. There's a 15-year-old who wrote a computer book and went to college on the royalties.

But many of these tales of successful teenage video game designers leave out an important part of the story. They forget that there's a difficult side to the business world. Not all good game designs lead to success.

Kay Borzsony is 15. He's one of the "amazing success stories" you may have read about or seen on TV. He was featured in *Time* magazine and mentioned in computer books

But Kay's experience in the adult world of business was much more difficult than he'd expected. He had some good luck and some bad luck, but in the end Kay got burned. "It's really tough out there," he says now.

STARTING EARLY

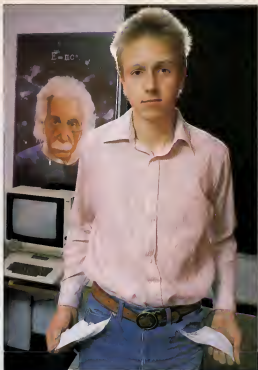
Since he first used an Apple II at age 11, Kay had a knack for programming. In the summer of 1982, he formed a company, Anstotle Software, with his best friend, Jonathan Dubman. They were going to create and market programs. The owner of The Computer Room, a Chicago store where Kay had been doing odd jobs over the summer, offered to put some of the Aristotle software on the racks. It seemed like the first step in just another typical com-

puter whiz kid success story.

Anstotle's biggest seller was a graphics editor, a sophisticated program that turns the cursor into a graphics controller. This software enabled users to manipulate triangles, boxes and circles. The shapes could be compressed, extended, rocked, bounced and scrolled; they could be filled with color or left hollow.

The price for the graphics editor was a very reasonable \$30. Comparable programs typically sell for about \$200. The Anstotle program sold well. One of the first buyers, rock star Todd Rundgren, used it to help design light shows for his band.

Then Kay and a friend wrote a program—a video game called *Castle Blaster*—that looked like an even bigger hit. A major game com-



pany heard about it and wanted to see it. They made no promises and mentioned no specific amount of money, but Kay believed they wanted to buy the concept.

Kay (who pronounces his name "Ki," rhyming with "Hi") had high hopes. He'd written a *Tron*-type game and a *Simon*-type game before, but this was a totally original program. As Kay describes it: "First you have to fight your way into an enemy castle, dodging cannon fire.

Then you search for and save the princess. Last you find the gunpowder room, blow the place up and get out of there."

A 'WHIZ KID' IS BORN

While Kay waited to hear from the game company, *Time* Magazine discovered him. He had been corresponding with Apple Founders Steve Jobs and Steve Wozniak for some time. At an Apple Club meet-

ing, a reporter from *Time* heard Jobs mention this young kid in Chicago who was making "millions of dollars" writing software. Steve was joking about the millions. (In fact, Kay had only made about \$500 from the graphics editor *J But*, soon after, Kay became a central figure in a *Time* cover story about kids and computers.

Then television's *PM Magazine* filmed Kay and Jonathan at the Computer Room. In the eyes of the

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ay has lived the highs and lows. He hobnobbed with computer superstars, but also broke off with a close friend.

media, this computer wizard was already a smashing success. But in the real world, things weren't working quite so smoothly.

Kay and Jonathan began arguing. "I wanted to expand the business and get more systematic about it," says Kay. "Jonathan wanted to leave things alone."

Kay asked Jonathan to sign a contract with him; he wanted to buy stock with the money they'd earned, set up a company bank account, get a phone and open an office. Jonathan said "No." He was content with things as they were. The company had no bank account and all its records were stored in shoeboxes.

Unable to agree or compromise, the two founders of Anstotle Software parted ways. Since they shared the rights to the programs they had written together, they had to stop selling their software.

"Everything just blew to pieces," recalls Kay.

That wasn't all. The game company decided not to buy *Castle Blaster*. A few months later, another company put a very similar game on the market. Kay has no evidence, but he feels strongly that somebody cheated him, or, at the very least, accidentally leaked the game idea. He now warns other programmers to copyright their material before they send it to anyone.

BACK DOWN TO EARTH

It was the autumn of 1982. Suddenly, all the publicity and excitement were gone, and Kay was just another kid who had to go back



to school and study again.

When he was in the spotlight, everyone seemed to forget that Kay was a kid, with a normal life and normal kid interests. He likes tennis and swimming and has a mania for collecting things. (His magazine collection includes every *Omni* that's ever been published.)

And, like a lot of other kids, he has his problems with school. By his own admission, Kay is a "C" student. To find the time for computers and his other interests, Kay's sometimes had to sacrifice good grades. "To get A's I'd have to work four hours a night," he says.

Sometimes Kay doesn't have time to keep his room clean. "But, my mom makes me do it," Kay's mother does make a small concession to his computing talent by allowing him to leave his computer work area messy. Kay proudly describes this zone as "sloppy, full of papers, garbage, leftover food from yesterday—you name it. But," he adds quickly, "I know where everything is."

Under the chaos lie his computer components. The Apple II, with its printer, disk drives and modem, sits on a typewriter wing attached to his desk. Just to the left is a three-by-

five-foot poster of Albert Einstein. "He's my idol," says Kay.

And, near Einstein, there's a signed photograph of the founders of Apple computer, Steve Jobs and Steve Wozniak. Kay likes to tell how he met Wozniak and Jobs. He simply sent them their first "thank you" letter for inventing the Apple. It wasn't a complaint, a demand, or even a request. Just a thank-you, from a person who appreciated what they'd done. They liked that.

The three built a friendship by mail and finally met in person at a meeting of the Chicago Apple Computer Club. There, with no warning, they called Kay up on stage in front of about 1,000 people and awarded him an Apple belt buckle with their signatures on it. The belt buckle is an extremely limited edition: there are only seven in the world.

MOVING ON

Kay has gone from the highs of hobnobbing with computer superstars to the lows of lost friendships. Along the way, he's learned a lot about the world of business.

"It's not really that complex," he says. "You have to research what you're getting into, and make sure you work well with your partner."

If the right opportunity comes along, Kay says he might return to this world of professional software design. But for now, he's satisfied being back where he began—going to school and writing computer programs just for fun.

STEVE SLOW is a freelance writer in New York.

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COMPUTERS COME TO BAT





MAJOR LEAGUE TEAMS SWING INTO THE COMPUTER AGE.



BY JIM LEWIS

When last year's baseball season was over, bats had beaten bytes.

The team without a computer, the Baltimore Orioles, topped the team with a computer, the Chicago White Sox, to win the American League Pennant.

That was a sad day for White Sox fans and computer rooters, but it may have marked the real beginning of baseball's computer era. The White Sox, who hadn't been near a championship in 24 years, used a computer—and some top-quality players—to win more games than any other team. The computer alone didn't make the White Sox winners. But Chicago's success showed that computers can help a team.

"[Computer] information can't make decisions for you, but the better information you have, the better decisions you can make," White Sox manager Tony LaRussa said last season.

"The computer can help a manager make decisions that win a few games down the line," adds Steve Boros, manager of the computer-using Oakland A's.

Managers like Chicago's LaRussa and Oakland's Boros travel with an 'extra player'—a computer

© TOM ZIMMEROFF/QUINCY LINDSON

Will printouts rule the dugout and robots argue with umpires?



operator. Perched in the press box behind home plate, the operator uses the computer to keep track of every pitch and hit.

"During the game, it's like using the computer to keep score," says the White Sox's Dan Evans, who operates the team's Apple II. "But after, you can do anything—anything imaginable—with the data." By analyzing that data, the computer shows a manager what has happened in previous games. That information can help a team win.

For example, Oakland is about to play the Milwaukee Brewers. Manager Boros asks A's computer operator Jay Alves to print out data about previous games. The computer will show where Robin Yount of the Brewers tends to hit the ball—and Boros can position fielders to be there to catch it. The computer will tell Boros which pitches Paul Molitor has trouble hitting, so he can tell A's pitchers what to throw. The computer lets Boros uncover the Brewers' weaknesses. In simple terms, Boros says, the computer can "make me a better manager."

ON THE FIELD

But no matter what the computer reveals, line drives will always beat disk drives. Steve Boros knows this, and you'll never see him—or Tony LaRussa—with printouts in the dugout.

"Absolutely not," says the Oakland skipper. "I don't have time to do that. I've got to watch the ballfield. I have to watch every one of my players... to take in all this information and react immediately."

Besides, stresses Boros, the computer is just one tool for helping him make decisions. Some players,

he admits, resent the computer because they feel it's cold and impersonal.

"I think the players mistrust the computer because they really don't understand its use," the A's manager says. "When it comes down to what the computer says is good strategy and what's best for the player's state of mind, I'll always go with what's best for the player."

Early last season, for example, A's relief pitcher Steve McCatty faced Detroit Tiger slugger Chet Lemon

with one out in the bottom of the ninth inning. There were two men on and the A's had a one-run lead. The computer showed that Lemon hit well against McCatty. But Boros stuck with his young reliever.

"I wanted to show McCatty that I've got confidence in him," recalls Boros. As it happened, Lemon lined the ball to second base. The A's got the double play and won the game. "I took a risk," Boros admits. "But if that player knows I've got confidence in him, that's going to help us in the long run."

And the computer can even help players build their own self-confidence, allowing them to overcome slumps.

"I think the computer will be most helpful as a teaching tool, to help correct mistakes and help somebody having a problem," says Chicago's Tony LaRussa. Boros agrees: "The beautiful thing is that the data can pinpoint specifics... A printout is a dramatic way to



Jay Alves of the A's tracks on-field action at his computer keyboard.

Line drives still beat disk drives. But com- puters can help.



announcers and sportswriters
computerized statistics

BASEBALL CARDS

But ballparks aren't the only place bats and bytes get together. Baseball fans are also starting to use computers to keep track of teams and players. (For a program that lets you do the same, see "Rate the Greats," next page.)

"I devise theories to explain how things in baseball are connected," says Bill James, who uses a KayPro II computer. "The computer helps me handle a lot more information."

James, whom many consider the ultimate fan, is author of the annual *Bill James Baseball Abstract*, a book of statistical observations about every team and player.

"I count all kinds of stuff that lots of people are sort of interested in, but nobody in their right mind would actually bother to count," says James. He looks at things like how players perform on their birthday ("Very well," he says. "I guess they figure it's their day."), and even how teams play on grass as opposed to artificial turf. (While National League teams do best on artificial turf, American League teams tend to have the edge on real grass.)

This year's edition of the *Abstract*

James Baseball Abstract is the first that was put together with the help of a computer. But Bill has been keeping track of statistics since he was a young boy collecting baseball cards. Switching to a computer has had advantages, he admits. "Data in your computer is a lot easier to experiment with and retrieve," Bill says. He quickly adds, however, that "a computer has no idea of what you should do with those numbers.... You still have to think."

Bill James thinks major league managers who use computers should be careful. A computer can help, but following its advice is not always the best strategy. "In baseball, there is an advantage in doing something unpredictable. There is always going to be a guessing game involved," he says. "If that guessing can be improved by computers, that can be good."

But some fans fear the sport's magic will be lost if baseball becomes too computerized—managers won't make a move without consulting their database, and robots will argue with umpires.

"That sounds fun," laughs Bill. He disagrees, however, with those gloomy predictions. Even the most powerful computer can't know everything that could affect the outcome of a ballgame, Bill stresses. "I could not imagine a computer big enough to store all that information, or complex enough to deal with it all."

Baseball's computer-users know their machines will never keep track of every pebble on the infield. But computers can still help them field a lot of helpful information.

And when you're trying to win a ballgame, says Steve Boros, "You take whatever help you can get." ☐

JIM LEWIS is senior editor of *ENTER*.

show the player where there is a problem that has to be fixed."

If things still go wrong, players have been known to use the computer as an alibi. For instance, Boros gave Dwayne Murphy a hard time after the A's centerfielder was thrown out on his way to third base. Murphy didn't flinch, he just smiled and said, "Ah, skip, the computer made me do it."

While the A's and White Sox currently lead the league in use of computers, many other teams are getting help from the high-tech bullpen:

- Sixteen major league teams are on-line by modem to the Major League Scouting Bureau, getting up-to-date information on hot pro prospects.
- The Atlanta Braves and New York Mets will begin using computers during the 1984 season.
- The New York Yankees keep track of 4,500 potential prospects on their computer. They also provide



A's skipper Steve Boros checks print-outs before—not during—the game.

© BOB ZIMMERMAN/JOAN MARCUS

RATE THE GREATS

BY GREG TRAUTMAN



CAL RIPKEN

ORIOLES .788



PETE ROSE

EXPOS .442



REGGIE JACKSON

ANGELS .581



DALE MURPHY

BRAVES 1.008

Take me out to the ballgame, get me some peanuts and Cracker Jacks—and a few statistics—and I'll tell you who's the best player out there on the field.

How? Well, it's not the peanuts and Cracker Jacks. (I only wanted them because I was hungry.) I've devised a computer program that rates ballplayers using some easily obtainable performance statistics. As quick as a Nolan Ryan fastball, you can enter the program into your computer and produce a number that reflects a player's overall value. It may seem simple, but it's a great way to win a baseball argument.

BATTER UP!

To write this program, I combined the five leading indicators of a player's offensive power—batting average (BA), home runs (HR), runs batted in (RBIs), hits (HT) and stolen bases (SB). I then entered these numbers (which you can find in any Sunday newspaper) into the computer, using these input statements:

10 INPUT "BATTING

AVERAGE"; BA
20 INPUT
"HOME RUNS"; HR
30 INPUT "RBIs"; RBI
40 INPUT "HITS"; HT
50 INPUT "STOLEN
BASES"; SB

That was the easy part: lines 10 to 50 assign the variables. The hard part was coming up with a formula to fit these variables together. I had to make sure a home run was worth more than a stolen base and an RBI more than a hit.

Every time I thought I had a perfect formula, strange things would happen. For example, one formula showed that John Wockenluse—a solid but unspectacular major leaguer—was twice as good a player as California superstar Reggie Jackson. I knew there was a problem.

Then, like a line drive off the bat of Rod Carew, it hit me: "The Adjusted Batting Average Formula." The formula gives each of the variables a different weight, so that a home run is worth six hits, a run batted in worth two hits, and a stolen base worth one. Line 60 figures the number of at bats (AB), and line 70

divides the other variables by this number.

To put this formula into your computer, just add the following:

60 AB = HT/BA
70 TOTAL = (HT + (4*HR) +
(2*RBIs) + SB)/AB
80 PRINT TOTAL

Using statistics from the 1983 baseball season, for example, my Adjusted Batting Average Formula gave American League Most Valuable Player (MVP) Cal Ripken a .788 average and National League MVP Dale Murphy an astounding 1.008. The formula also confirms that 1963 was an off year for stars like Reggie Jackson and Pete Rose. Jackson's score was .581, and Rose's .442.

There's a flaw in the formula. There's no allowance for defensive play. A player who makes stupendous catches won't get full credit.

It's possible to write a program that includes defensive information. You might want to try.

Meanwhile, could you pass the Cracker Jacks, please? E

GREG TRAUTMAN, 17, is a member of the ENTER advisory board.

VIDEO BALLPARK

BY PHIL WISWELL



You don't have to be Steve Boros of the Oakland A's to get managing help from a microchip: Super Action Baseball, a new home video ball game from Coleco, can turn you into a state-of-the-art skipper.

In the past, video game baseball teams were tough to control. You could move runners and pitchers around, but other players were very difficult to keep in the action. With Super Action Baseball, it's a whole new ball game.

HANDS-ON BASEBALL

Super Action Baseball (for ColecoVision) comes with Super Action Controllers that combine a joystick, speed roller, 12-key keypad and four trigger buttons. Together, these controls give you the power to move any player on the field.

As the game begins, you get a view of the pitcher and batter while three "windows" show what's happening on the bases. The instant a ball is hit, you get a full field view.

The pitcher selects a pitch on the keypad and fires away. But this game lets you do more than just press a button to pitch. By wiggling the joystick, you can get real control over the way the baseball crosses the plate. A good pitcher can mow down the opposition with the style and flair of a Steve Carlton. A no-hitter is a real possibility.


The batter also has control—and, as in any ballgame, timing is everything. Time your swing, flick the joystick and you can pop that ball right over the wall. But you had better have quick reflexes if you've got to run the bases. The game's speed roller—which moves the runner around the bases—is just not as responsive as it should be. You really have to spin to get anywhere.

To control your fielders, squeeze the appropriate trigger button and move the joystick. It's a real challenge to remember which trigger activates which player. But once you've got that down, you'll be able to move any player almost anywhere on the field. As soon as your fielder has the ball, just aim

and throw. If it's a close play, the umpire will let you know who won. As in real baseball, it doesn't do any good to argue with the ump.

TALKIN' BASEBALL (ALMOST)

About a year ago, there was a breakthrough that could have given you even more control over your video game ball team. This breakthrough, the MBX (Milton Bradley Expander) included a microphone headset that let you use your voice to control on-the-field action. Unfortunately, the MBX only worked with Texas Instrument home computers. When T. I. went out of the home computer business, Milton Bradley stopped making the MBX.

The MBX added a new dimension to game control and I was sorry to see it disappear. Perhaps somebody will make this kind of voice controller for other computers. Then, when you call out "Play ball!" you can really play ball. 

PHIL WISWELL is an ENTER contributing editor.



Meandering Flowchart

BY MICHAEL DAYTON

A crazed computer programmer has stolen all the software for your town's traffic computer, and won't give it back unless he is paid off with a guest appearance on *Whiz Kids*. Meanwhile, all the traffic lights in town are stuck on red. Main Street looks like a giant parking lot.

It's up to you to recover the stolen programs, but the only clue you have is a ragged piece of printout paper found at the scene of the crime. On it is a jumbled scrawl of shapes and lines—the mad programmer's flowchart of the steps you must take to track down the hidden software.

GO WITH THE FLOW

A flowchart is simply a diagram of the steps you want your computer to take when you run your program. It helps you organize your thoughts before you sit down to write. It's also a useful tool for debugging your work—even after the program is running.

Writing a flowchart helps you arrange the steps your program will follow before you write a single line of programming code. It's especially useful because it can give you an overview of the entire structure of your program. That's not important if the program you're writing is only ten lines long. But even professional programmers can get lost in their own logic once a program runs longer than a hundred lines.

Flowcharts will not only make your programming easier, they will make you a better programmer. If you find yourself drawing a flowchart that looks like a bowl

This rambling flowchart is found on the following pages. To get to the software, you'll have to cross a river and avoid a series of traps along the way. Watch out for the dreaded endless loop—a common programmer's pitfall. And remember to pick up all the equipment you'll need, including a four-part access code.

Before you start, you'll find some helpful information about flowcharts on these two pages. Remember, though, the flowchart map to the hidden software was written by someone dealing without a full deck of microchips. So, be prepared for surprises.

What sequence of Y and N moves will get you through quickest? Try your luck, then check the answer on page 64.

of spaghetti, that's a sign that your program is too complicated. Keep at it until you have the simplest flowchart possible. (Our flowchart is a lot of fun, but it would make a terrible program.)

DON'T THROW IT OUT!

When you're done writing the program, don't throw your flowchart away. You'll find it's very helpful in debugging—getting your program to run the way you wanted it to. When you start seeing error messages, sometimes the only thing to do is to step through the program, one line at a time. Your flowchart makes it a lot easier to do this and to pinpoint where your mistakes are.

Did you ever read a program written by someone else and try to figure out what it's supposed to do? Flowcharts come in handy then, too. They give you a

simple explanation of what the program is about.

Flowcharts exist only to help you, so you can make them up anyway you want. But remember—you may need to refer to your chart weeks after it was written. Or someone else may want to look at it in order to understand what you had in mind. That's why it's a good idea to follow some simple conventions.

First, there are commonly used symbols for the different steps a program can take (see glossary).

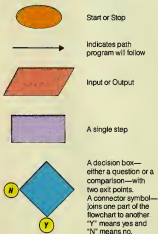
Second, flowcharts generally should move from top to bottom and from left to right.

Below, we've given you a very simple flowchart for a program that writes the word "Hello" five times. That should give you an idea of how the different symbols are used and put together. Will that help you get started in flowcharting? We hope so. Will it help you recover the stolen programs on the next page? We doubt it—but good luck!

FLOWCHART FIELD GUIDE

Here is a simple flowchart for a BASIC program that prints the word "Hello" five times. Notice that in the chart we have abbreviated the BASIC statements in some cases. This is a common practice, but if you want, you can write out the whole statement. Also, it's a common practice to include a START and STOP symbol, even if your program does not contain matching statements.

GLOSSARY



SAMPLE FLOWCHART



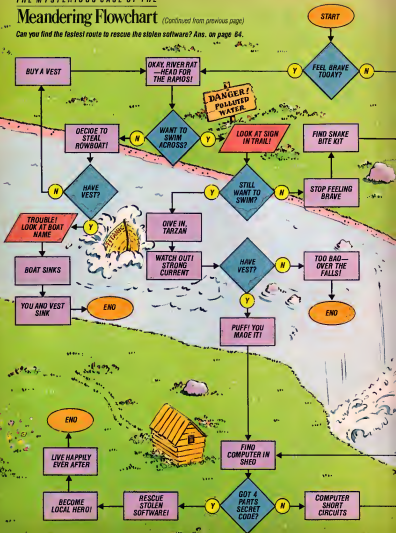
PROGRAM

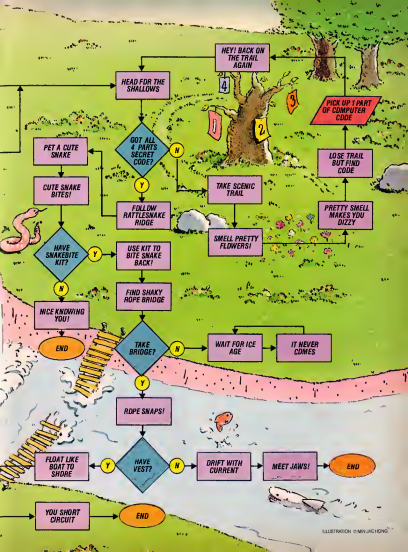
```
10 N = 0
20 PRINT "HELLO"
30 N = N + 1
40 IF N < 5 THEN 20
50 END
```

Meandering Flowchart

(Continued from previous page)

Can you find the fastest route to rescue the stolen software? Ans. on page 84.





PENCIL CRUNCHERS

GAME SEARCH

BY REBECCA HERMAN

To play the games listed below, you need a computer. But to find them in our word-search all you need is a pencil! The words are hidden across, up and down and diagonally. Some letters may be used more than once.

When you've found all 25 games, start at the top left and write down all the uncircled letters—they'll spell out a computer noddle and its punchline.

ARCHON

CHOPCLIFTER

CRITICAL-MASS

CROSS FIRE

DEADLINE

GRUDS IN SPACE

LEGIONNAIRE

LODE RUNNER

MASTER TYPE

NEW WORLD

OIL BARONS

PARSEC

PENSATE

PIC MAN

RICOCHET

ROBOTWAR

ROCKY'S BOOTS

SERPENT'S STAR

SHAMUS

SOCCER

TIME ZONE

TRANSYLVANIA

WAYOUT

WIZARDRY

ZORK I

(Answers on page 64.)

E	C	R	T	T	I	C	A	L	M	A	S	S	N	W	H
T	R	E	P	Y	T	R	E	T	S	A	M	E	A	R	T
R	D	I	S	H	A	M	U	S	E	I	W	R	R	O	D
A	T	H	F	E	C	O	O	P	N	W	I	P	E	C	N
N	M	R	R	S	Y	P	U	A	O	T	Z	E	N	K	O
S	T	E	A	A	S	E	R	R	Z	E	A	N	N	Y	H
Y	S	T	W	A	Y	O	L	S	E	H	R	T	U	S	C
L	N	F	T	E	I	D	R	E	M	C	D	S	R	B	R
V	A	I	O	T	K	E	T	C	I	O	R	S	E	O	A
A	M	L	B	A	R	A	O	T	T	C	Y	T	D	O	H
N	E	P	O	S	O	D	E	F	L	I	O	A	O	T	P
I	I	O	R	N	Z	L	P	Y	D	R	I	R	L	S	S
A	P	H	L	E	G	I	O	N	N	A	I	R	E	K	L
E	E	C	A	P	S	N	I	S	D	U	R	G	T	S	G
O	F	S	O	C	C	E	R	X	A	M	E	U	L	B	O
R	A	D	R	S	N	O	R	A	B	L	I	O	I	V	E

Games Gone GONZO

ONE MAN'S VIDEO VISIONS

Over the past few months, I've done an extremely unscientific study of the video games people play. As a result, I've come to a few important conclusions. In the interest of science, truth, justice and a few laughs, I am pleased to offer my observations to ENTER's readers.

First of all, it seems to me that video and computer games are about where electric guitars were in the early 1960s. They've been around for a while, but your parents would feel a whole lot better if you were playing the trombone instead. Mine would have, anyway.

See, in the early 1960s you couldn't say, "Hey, Mom, gimme a thousand dollars so I can play power chords while my friend Hal howls nonsense at screaming girls." Instead you had to say, "They really need a guitar in the school marching band. They're going to give me a 400-foot extension chord and a wagon for my amp, so all we have to do is buy a Stratocaster and a Twin-Reverb."

Which is just like now. You can't say, "Hey, Mom, gimme a thousand dollars so I can chase Thorax the Barbarian through the Maze of Death." Instead you gotta say, "My teacher says if you buy me a Com-

mander Goonwaddle XJ7P, it'll teach me how to balance a checkbook."

OBSERVATION NUMBER TWO

My second discovery was that I don't play video games very well. Last summer, I was doing a story about the rock band RED Speedwagon. They had a Zaxxon set up in their dressing room. So I played Zaxxon for about 12 hours when I should have been interviewing musicians. Fortunately they had it fixed so you didn't have to put in money, or I would have spent my entire story fee before I zapped Zaxxon. I have been very wary of learning any new computer games since then. Put in a quarter and by the time you look up, your rent money is gone.

Now we get to the meat of this essay. I figure the only way to beat the video game system is to invent your own games and let someone else give you his quarters. So I'm hoping someone out there who knows how computers work will write a program for the following six incredible games that I've invented, and cut me in for half the royalties. My ideas are on the next page. If you cooperate, we can get rich together.

BY CHARLES M. YOUNG



SPACE PROCRASTINATORS

On the third moon of Jupiter, Dad wants you to mow the lunar lawn before the Martians come over for dinner. This voice-controlled game lets you use your wits to avoid work. Points are awarded for creative excuses that let you remain in bed watching interplanetary TV and munching Jupiter junkfood. Penalties are assessed for sulking so much that Dad yells at you and makes you wash and wax the family space shuttle. Grand prize: Dad mows the lawn himself.

In a later screen, you must avoid handing in a homework assignment on the major exports of the planet Pluto. If your excuse works, the teacher lets you take a field trip to Oreo, a cookie-shaped moon in the Nabisco galaxy. If you lose, you mow the teacher's lawn.

PUNKEY KONG

On the top of the Empire State Building, a giant ape with a short haircut is playing dissonant guitar chords and screaming about the sickening state of modern society. Down below, thousands of pedestrians are stuffing cotton in their ears in an attempt to escape the noise. Can you climb a skyscraper fast enough to save New York's hearing? Or will you have to use a Jefferson Airplane to get the ape?



TOOTSIE-TRON



You accidentally press the wrong button on a computer and are sucked into a strange electronic world where you must star in a soap opera. To win, you must avoid autograph-seeking fans, potential boyfriends—and girlfriends—and arrive at your TV show on time. Grand prize: you become the romantic lead in the soap.

SATURDAY MORNING FEVER



Fighting off extremely dumb cartoon characters, you must swim the boiling Sea of Food Coloring, cross the burning Dunes of White Sugar, and capture the Vitamin Pill guarded by Captain Cereal.

ATTACK OF THE NO-FRILLS-OID

Paint a monster on a piece of plywood and throw rocks at it.




DR. DECIMATION AND THE DEMON MALLARDS OF MINNOW MOUNTAIN

The Ultimate Science Fiction Video Game

You have been captured by a mad scientist whose castle is guarded by a flock of killer ducks. He takes away your sneakers and glues small fish and insects to your feet. You must twist your way through the maze-like chambers of the castle, evading the hungry ducks who are snapping at your toes.

If you reach the castle's exit sign (conveniently lit up



in the dungeon), the scene then changes to a rope-and-chain screen. There, a rescue party—the Thing, Luke Skywalker, and the Eggplant That Ate Chicago—takes you to safety in the Starship Enterprise. 

CHARLES M. YOUNG, who really can't play video games very well, has written for The New York Times and Rolling Stone.

ENTER CONTEST

Did you see your favorite idea for a video game here? If not, send us a description of the silliest or dumbest game you can think of. If we like your idea, we'll print it in ENTER, and send you a T-shirt. Send to: ENTER, 'Silly Games,' P.O. Box 777, Ridgely, N.J. 07657.

PENCIL CRUNCHERS

COMPUTER SCRAMBLE

BY PHIL WISWELL

Here's a chance to test your computer savvy and unscramble

words at the same time. Below are 14 computer terms that have been scrambled into other words. Can you rearrange the letters so that they become computer words and match up with their definitions on the right?

For more of a challenge, test your unscrambling skills by

covering up the definitions and working from the scrambles alone. Or, test your knowledge of computer terms by covering the word list and trying to figure out the words from the definitions alone. Good luck!

(Answers on page 84)

- | | | |
|-------------|-------|--|
| 1. VASE | _____ | Make a copy of a working file |
| 2. URN | _____ | Command to start program |
| 3. TURNER | _____ | What one does at the end of a line |
| 4. SKID | _____ | Where to store lots of data |
| 5. BROAD | _____ | Attach chips here |
| 6. SUB | _____ | Allows flow of data from one computer component to another |
| 7. SILT | _____ | How to summon your program lines from memory |
| 8. MOPER | _____ | One kind of silicon chip for game software |
| 9. WOLF | _____ | Movement of electrical current through computer |
| 10. PEON | _____ | Gets you into a closed file |
| 11. STEER | _____ | What to do at the end of a game |
| 12. CORSET | _____ | Part of a track on a disk |
| 13. DARE | _____ | BASIC command to look for a Data statement |
| 14. PROTEIN | _____ | Keeps track of a specific memory address |

BASIC TRAINING

PROGRAMS FOR YOUR COMPUTER

*Adam, Apple, Atari, Commodore 64, IBM,
T.I. 99/4A, Timex-Sinclair, TRS-80, VIC-20*

Faster than an owner's manual! More exciting than TV! Able to program sound and graphics with a single keystroke! Look! There in the magazine! Is it an article? Is it a puzzle page? No, it's BASIC TRAINING!

Yes, BASIC Training, which disguised as a mild-mannered

section of ENTER magazine, every month brings you truth, justice, programming and the American way.

We'd like to thank all of you for the great programs and ideas you've been sending in. And thanks for the enthusiastic response to the BASIC Training

Challenges. We'll start printing your responses in the next issue. (For more on the Challenge and sending in your programs, see the last page of BASIC Training.)

Just keep those cards and letters coming, folks—but please, no Kryptonite.

—Richard Cheval, Technical Editor

ATARI: BUBBLE SORT

No, a bubble sort is not something you do in a bathtub full of soapuds. It's the name of one of the simplest methods of sorting data with a computer.

Many people think there is some magic "SORT" button on computers that allows you to alphabetize items or put lists in numeric order. But like everything else a computer does, sorting has to be programmed.

The bubble sort got its name because if you display a list while it is being sorted this way, items appear to float or "bubble up" to the top until they find their correct place. And that's exactly what this program does—it displays a bubble sort in action on your screen.

You choose the characters to be sorted—either letters or numbers—and the program will show you how the sorting process works. Do you know how the computer determines which characters go first? It gets the ASCII value of each

character in lines 160 and 170 and compares them in line 180. (If you don't know what ASCII is, take a look in your owner's manual.)

If the program moves too quickly for you to follow, you can change the delay loop in line 185 to:

185 FOR D = 1 TO 300: NEXT D

```
10 GRAPHICS 0
20 DIM X$(1):REM FOR
  EXCHANGE
30 DIM A$(1023)
40 REM 1023 = SCREEN
  SIZE - 1
```

50 PRINT "THIS PROGRAM
 DEMONSTRATES A
 SIMPLE METHOD OF
 SORTING"

60 PRINT "IT'S CALLED A
 BUBBLE SORT—YOU'LL
 SEE WHY"

70 PRINT "PLEASE TYPE UP
 TO 1023 CHARACTERS
 TO BE SORTED"

80 PRINT "THEY CAN BE
 ANY CHARACTERS
 OTHER THAN THE
 COLON OR COMMA"
 (Program continues on next page)



ILLUSTRATIONS BY MARY LYNN BLOOMER

BASIC TRAINING

(Program continued from previous page)

```
90 INPUT AS
100 ?CHR$(128):REM CLEAR
    SCREEN
110 POSITION 2,0
120 PRINT AS:;A=LEN(AS)
130 FOR Q=1 TO A-1
140 C=0:REM FLAG
150 FOR H=1 TO A-G
160 L1=ASC(AS(H,H))
155 REM FIND 1ST
```

```
CHARACTER
170 L2=ASC(AS(H+1,H+1))
175 REM FIND 2ND
    CHARACTER
180 IF L1>L2 THEN GOSUB
    500
185 FOR D=1 TO 100:NEXT D
190 NEXT H
200 IF C<>0 THEN NEXT G
210 POSITION 3,20
220 PRINT "DONE! PRESS
    RETURN TO CONTINUE"
```

```
230 INPUT AS
240 RUN
500 C=1:REM A SWITCH
    WILL BE MADE
505 REM SAVING 1ST
    CHARACTER
510 XS=AS (H,H)
515 REM THE SWITCH
520 AS (H,H)=AS(H+1,H+1)
530 AS(H+1,H+1)=XS
540 POSITION 2,0: ? AS;
550 RETURN
    —David Lewis
```

COMMODORE 64: MUSIC MATCH

This game program for the Commodore 64 uses sounds and colors to test your memory against the computer's.

The computer gives you a sequence of sounds and colors, and challenges you to remember the order. Each musical note is associated with a key (A-K) and its own color (A=white, S=red, etc.) The computer plays a note and displays the matching color in the border of the screen. To answer, you must press the key that will produce the same color and sound.

The computer keeps going until it has built up a series of eight. If you can repeat all the notes in the right order, you win. (Don't think you can learn the sequence by playing the game over and over, because each time you play it's different.)

We had a lot of fun with this game, testing our memories and we'd do it again—if we could remember where we put our computer.

Note: The following symbols are used in the program—

\$ Means hold down SHIFT and press CLR/HOME.
% Means hold down the Commodore key and press 8.
% Means press the up and down CRSR key.
% Means press the right and left CRSR key.

```
5 PRINT "8"
10 POKE 53281,0
15 S=54272
20 FOR I=0 TO 30
25 POKE S+1,0:NEXT
30 POKE S+5,0: POKE S+5,0
35 POKE S+24,15
40 DIM HI(9), LO(9),
    KEY$(8), SEQ(8)
45 FOR I=1 TO 9
50 READ HI(I): NEXT
55 FOR I=1 TO 9
60 READ LO (I): NEXT
65 FOR I=1 TO 8
70 READ KEY$(I): NEXT
100 PRINT "+"; " MUSIC
    MATCH PROGRAM"
105 PRINT "EEEEAA=WHITE,
    S=RED, D=CYAN,
    F=PURPLE"
110 PRINT "GG=GREEN,
    H=BLUE, J=YELLOW,
    K=ORANGE"
115 FOR I=1 TO 8
120 SEQ(I)=INT(8*RND(1))+1
125 NEXT
```

```
130 FOR J=1 TO 8:PRINT J
135 FOR L=1 TO J
140 I=SEQ(L):GOSUB 700
145 FOR K=1 TO 200
150 NEXT:NEXT
155 FOR L=1 TO J: GOSUB
    500
160 IF I <> SEQ(L) THEN 200
165 NEXT
170 FOR K=1 TO 300
175 NEXT:NEXT
180 PRINT "+"; " PERFECT
    SCORE!"
185 GOTO 215
200 GET AS:I=9: GOSUB 700
205 PRINT "OOPS!"
210 PRINT "+"; " YOU
    SCORED ";J-1
215 FOR K=1 TO 900
220 GET AS:NEXT
225 PRINT " TRY
    AGAIN"
230 FOR K=1 TO 800: NEXT
235 GOTO 100
500 GET AS: IF AS=" THEN
    500
510 FOR H=1 TO 8
520 IF AS=KEY$(H) THEN
    I=H: GOSUB 700
530 NEXT: RETURN
700 POKE S,LO(I): POKE S+1,
    HI(I)
710 POKE 53280,I
715 POKE S+4,16
```

(Program continues on next page)

(Program continued from previous page)

720 POKE S + 4,17
725 RETURN

800 DATA 8,9,10,11,12,14,16,
16,100
810 DATA 97,104,143,48,143,
24,210,195,0

820 DATA "A","S","D",
"F","Q","H","J","K"

—Mark Sutton-Smith

TRS-80: TURING TUMULT

Computers can't think—at least, not yet. But they can do some things, like arithmetic calculations, so quickly that they seem to have incredible intelligence.

Calculating doesn't require intelligence, though—or even a computer. British mathematician Alan Turing designed a very simple mechanical machine that could imitate the most complex computer. This program, written for TRS-80 computers by 19-year-old David Lewis, creates a Turing machine that does multiplication on your TV screen.

The machine can only do five things—and all the action takes place right in front of you. It can move to the left, move to the right, erase the square it is on, or write a "1" or an "X". Even so, it can find the product of two numbers.

How does it do it? First it translates the two numbers you give it into strings of 1s. For example, 5 would be represented as 11111. Then it builds a string of 1s for the product, by a process that is pretty much like counting on your fingers.

To see clearly how simple the machine is, try giving it the numbers 2 and 5; then try 5 and 2. The difference in the way it handles the two problems should help you understand how it works.

10 CLEAR 300:CLS
20 PRINT "THIS PROGRAM

DEMONSTRATES A"
30 PRINT "SIMPLE TURING
MACHINE FOR"
40 PRINT
"MULTIPLICATION. YOU
INPUT TWO"
50 PRINT "NUMBERS AND
IT DISPLAYS THEM"
60 PRINT "AS A STRING OF
ONES. THEN IT"
70 PRINT "SHOWS YOU HOW
IT FINDS THE"
80 PRINT "PRODUCT"
90 PRINT "PLEASE TYPE
TWO NUMBERS, N1,N2"
100 INPUT "WHOSE
PRODUCT IS LESS THAN
18";N1,N2
110 IF N1*N2>18 THEN 90
120 CLS:PRINT@96,"X";
130 FOR NUM1=1 TO N1
140 PRINT "1";:NEXT
150 PRINT "X X";
160 FOR NUM2=1 TO N2
170 PRINT "1";:NEXT
180 PRINT "X"
190 P=1123+N1+N2:D=1
200 O=P+32
210 POKE 0,96:O=P+32:
POKE Q,97
220 FOR G=1 TO 100:NEXT
230 C=PEEK(P)
240 ON D GOTO
250,260,270,280,290,
300,310,320,330,340,
350,360,370,380
250 P=P-1:IF C=88 THEN
D=2
260 GOTO 210
260 IF C=96 THEN P=P-1
ELSE POKE 96:D=3
265 GOTO 210
270 IF C=96 THEN P=P-1

ELSE POKE 96:IF C=99
THEN D=12 ELSE D=4
276 GOTO 210
280 P=P+1:IF C=88 THEN
D=5
285 GOTO 210
290 POKE 96:D=6:GOTO
210
300 P=P+1:IF C=88 THEN
D=7
305 GOTO 210
310 IF C=96 THEN POKE
R113:D=8 ELSE P=P+1
315 GOTO 210
320 IF C=96 THEN
P=P+1:D=9 ELSE
P=P-1
325 GOTO 210
330 IF C=96 THEN P=P+1
ELSE IF C=88 THEN
P=P-1:D=10 ELSE 290
335 GOTO 210
340 IF C=96 THEN POKE
R113 ELSE P=P-1:IF
C=88 THEN D=11
345 GOTO 210
350 IF C=96 THEN P=P-1
ELSE POKE 96:IF C=88
THEN D=12 ELSE D=4
355 GOTO 210
360 IF C=96 THEN P=P+1
ELSE POKE 96:D=13
365 GOTO 210
370 IF C=113 THEN POKE
96 ELSE P=P+1:IF
C=88 THEN D=14
376 GOTO 210
380 IF C=96 THEN POKE
R88:PRINT @9, "DONE";
END ELSE P=P+1:GOTO
210

—David Lewis

(BASIC training continues on next page)

BASIC TRAINING

(BASIC Training cont. from previous page)

COMPUTER TUTOR

If you don't use this program, you're never going to college, your friends will all laugh at you, and your acne will get much worse. Don't believe it? O.K., so we exaggerated a little. It must have been all those computer commercials we've seen on TV lately.

But even if it won't get you into college, this program will help you to learn just about any subject you want. Written by 16-year-old Mitch Grossbach of Plainville, NY, it allows you to create a set of computerized flashcards. Then it tests you at random, and keeps track of which cards you've answered correctly. Right now, it's written for someone who wants to learn a foreign language, but you can use the same program to test yourself in any subject.

Below is a complete listing of the program for Apple and Adam computers. After that, you'll find simple instructions for adapting it to Timex-Sinclair T1 99/4A, IBM, Commodore 64 and VIC-20.

There are plenty of refinements you can add to make this a better program. One would be a subroutine that allows you to save the lists of words on a disk, so you don't have to type them in again.

And, if you come up with a program that can cure acne, you may win yourself the Nobel Prize.

APPLE, ADAM:

```
10 REM COMPUTER TUTOR
20 REM Q=NO. OF WORDS
   REM TESTED
35 REM G=NO. OF GUESSES
30 REM F$=FOREIGN
   REM WORDS
35 REM E$=ENGLISH
```

```
WORDS
40 REM C$=CORRECT
   REM ANSWERS
45 DIM E$(100),F$(100),
   C$(100)
50 HOME
55 PRINT "I AM YOUR
   REM COMPUTER TUTOR"
60 PRINT "I WILL TEST YOU
   REM IN ANY FOREIGN
   REM LANGUAGE"
65 PRINT "HIT RETURN TO
   REM BEGIN"
70 INPUT R$
80 GOSUB 500
85 REM CHOOSE TEST
90 HOME
95 Q=0:G=0
100 PRINT "1) ENGLISH
   REM TO ";L$;"?"
105 PRINT "2) ";L$;" TO
   REM ENGLISH?"
110 INPUT CH
115 IF CH=1 THEN GOSUB
   REM 700
120 IF CH=2 THEN GOSUB
   REM 900
125 PRINT "YOU'VE
   REM COMPLETED A ROUND"
130 PRINT "DO YOU WANT
   REM TO DO MORE (Y/N)";
135 INPUT Y$
140 IF Y$="Y" THEN 90
145 END
500 REM ENTER WORDS
505 HOME
510 PRINT "HOW MANY
   REM ENTRIES?"
515 INPUT ENT
520 PRINT "WHAT IS THE
   REM FOREIGN LANGUAGE?"
525 INPUT L$
630 FOR W=1 TO ENT
535 HOME
540 PRINT "ENGLISH
   REM WORD:";
545 INPUT E$(W)
550 PRINT L$;" WORD:";
555 INPUT F$(W)
660 NEXT W
555 W=W-1
```

```
570 RETURN
700 REM TEST 1
705 R=INT(W*RNDR(1))+1
710 REM TO CHECK
   REM PREVIOUS ANSWERS
715 FOR P=1 TO Q
720 IF F$(R)=C$(P) THEN 705
725 NEXT P
730 HOME
735 PRINT "ENGLISH
   REM WORD:";E$(R)
740 PRINT
   REM L$;" EQUIVALENT:"
745 INPUT A$
750 IF A$=F$(R) THEN 795
755 G=G+1:IF G>2 THEN
   REM 775
760 PRINT "WRONG—TRY
   REM AGAIN"
755 FOR D=1 TO 1000
770 NEXT D:GOTO 730
775 PRINT "WRONG"
780 PRINT "THE MEANING
   REM OF ";E$(R);" IS ";F$(R)
785 FOR D=1 TO 2000:
   REM NEXT D
790 G=0:GOTO 700
795 PRINT "CORRECT"
800 FOR D=1 TO 1000:
   REM NEXT D
805 G=0:Q=Q+1;
   REM C$(O)=F$(R)
810 IF Q=W THEN 820
815 GOTO 700
820 RETURN
900 REM TEST 2
905 R=INT(W*RNDR(1))+1
910 FOR P=1 TO Q
915 IF F$(R)=C$(P) THEN 905
920 NEXT P
925 HOME
930 PRINT L$;" WORD:";
   REM F$(R)
935 PRINT "ENGLISH
   REM EQUIVALENT:"
940 INPUT A$
945 IF A$=E$(R) THEN 990
950 G=G+1:IF G>2 THEN
   REM 970
965 PRINT "WRONG—TRY
   REM (Program continues on next page)
```


(Program continued from previous page)

```
AGAIN"
960 FOR D=1 TO 1000
965 NEXT D: GOTO 925
970 PRINT "WRONG"
975 PRINT "THE MEANING
OF":FS(R);" IS ":ES(R)
980 FOR D=1 TO 2000:
NEXT D
985 G=0: GOTO 980
990 PRINT "CORRECT"
995 FOR D=1 TO 1000:
NEXT D
1000 G=0:O=O+1:
CS(O)=ES(R)
1005 IF O=W THEN 1015
1010 GOTO 980
1015 RETURN —Mitchell Grossbach
```

TMX SINCLAIR 1000 (with 16K) OR 1500: Delete lines 45, 85, 140, 145, 565, 705, 720, 750, 755, 790, 805, 810, 905, 915, 945, 950, 985, 1000. Then add these lines

```
41 RAND 0
45 DIM ES(100)
46 DIM FS(100)
47 DIM CS(100)
95 LET O=0
95 LET G=0
140 IF YS="Y" THEN GOTO 90
145 STOP
565 LET W=W-1
```

```
705 LET R=INT(W*RND)+1
720 IF FS(R)=CS(O) THEN
GOTO 705
750 IF AS=FS(R) THEN GOTO
795
755 LET G=G+1
755 IF G>2 THEN GOTO 775
790 LET G=0
791 GOTO 790
805 LET G=0
805 LET O=O+1
807 LET CS(O)=FS(R)
810 IF O=W THEN GOTO 820
905 LET R=INT(W*RND)+1
915 IF ES(R)=CS(O) THEN
GOTO 905
945 IF AS=ES(R) THEN GOTO
980
950 LET G=G+1
951 IF G>2 THEN GOTO 970
985 LET G=0
985 GOTO 980
1000 LET G=0
1001 LET O=O+1
1002 LET CS(O)=ES(R)
1005 IF O=W THEN GOTO 1015
```

Change every statement that reads HOME to CLS.

Break all remaining multiple statement lines into single statement lines

IBM PC AND PC JR.:
Delete lines 705 and 905.

Then add these lines:

```
41 RANDOMIZE
705 R=INT(RND*(W+1))
905 R=INT(RND*(W+1))
```

Replace all HOME statements with CLS

COMMODORE 64 AND VIC 20:
Replace all HOME statements with PRINT CHR\$(147)

TI/994A: Delete lines 115, 120, 705, and 905. Then add these lines:

```
41 RANDOMIZE
115 IF CH<>1 THEN 120
115 GOSUB 700
120 IF CH<>2 THEN 125
121 GOSUB 900
705 R=INT(W*RND)+1
905 R=INT(W*RND)+1
```

Replace all HOME statements with CALL CLEAR. If you don't have extended BASIC, multiple statement lines must be broken up into single statement lines.
(BASIC Training continues on next page)



BASIC TRAINING

(BASIC Training cont. from previous page)

ATARI: LINE DESIGN

Here's a graphics program for Atari computers written by 17-year-old Derrick Deldrick of Sheffield, Ohio. It draws an endless series of geometric designs on your TV or monitor. It's simple, but it's a lot of fun to watch. Just leave it running and let your friends wonder what it's doing.

```
10 OR.8 + 16
20 A = 319*RND(8):
  X = 319*RND(8)
30 B = 191*RND(8):
```

```
  Y = 191*RND(8)
40 C = INT(14*RND(8) + 2)
50 FOR J = 1 TO 48
55 D = INT(8*RND(8)) + 1
60 T = 5 + INT(68*RND(8))
65 FOR I = 1 TO T
70 ON D GOSUB 240,
  250,260,270,280,
  290,300,310
75 SE.2,C,8:COLOR 3
80 IFX < 0 THEN X = 319
85 IFA < 0 THEN A = 319
90 IFB < 0 THEN B = 191
95 IFY < 0 THEN Y = 191
100 IFA > 319 THEN A = 0
105 IFX > 319 THEN X = 0
110 IFB > 191 THEN B = 0
115 IFY > 191 THEN Y = 0
120 PLOT A,B:PLOT 319-A,B
125 PLOT 319-A,191-B
```

```
130 PLOT A,191-B:PLOT X,Y
135 PLOT 319-X,Y
140 PLOT 319-X,191-Y
145 PLOT X,191-Y
150 NEXT I:NEXT J
155 FOR W = 1 TO 400
160 NEXT W:GOTO 10
240 A = A - 1:X = X + 1
250 B = B + 1:Y = Y - 1:
  RETURN
260 B = B - 1:Y = Y + 1
270 A = A + 1:X = X - 1:
  RETURN
280 A = A - 1:X = X - 1
290 B = B - 1:Y = Y - 1:
  RETURN
300 B = B + 1:Y = Y + 1
310 A = A + 1:X = X + 1:
  RETURN
```

—Derrick Deldrick

CHALLENGE #4: PLAY BALL!

Springtime brings to mind the Easter Parade, April showers, May flowers and plans for summer vacation. But for some of us, the beginning of spring means just one thing—baseball!

Just by coincidence, baseball is the topic of this month's BASIC Training Challenge. Does this mean we expect you to write a program that will turn your computer into a great shortstop? Not exactly. We just want you to dream up a program that has some kind of baseball theme.

For a real fan, that might be a program that computes and keeps track of league standings, batting averages and other statistics. (See "Rate the Greats" in this issue.) Or, it might be a baseball trivia quiz. If you're a graphics designer, you might try to create a scoreboard fireworks display on your screen.

Whatever you come up with,

we'd like to see it. Send your finished program to: Challenge #4, ENTER, CTW, 1 Lincoln Plaza, New York, NY 10023. We'll pick our favorites and print them in a future



issue. If we print yours, we'll send you \$50 and an ENTER T-shirt.


Remember to include a note telling us your name, age, address, the type of computer your program is written for, and your T-shirt size. Also, remember that our space is limited: keep your program under 100 lines.

SEND US YOUR PROGRAMS!

We'd also like to see any other programs you've written. Send them to BASIC Training at the address above. If we print one of yours, we'll also send you \$50 and an ENTER T-shirt.

CORRECTIONS

In the March 1984 issue, the "Self-Portrait" Program for the IBM PC contained an error on line 90. The line should have read:
90 PRINT: INPUT "Are you happy, sad, or angry?";M\$

In "Video Valentine" for the TI 99/4A, line 140 should read:
140 PRINT TAB(13); "DAY" 

(Continued from page 5)

LO-CAL HI-TECH

First came the one-calorie soft drink—now there's the Fitness-3 Calorie Computer. It's a pocket calculator designed to make dieting just a little easier.

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you might want to reward yourself with a piece of cake.

So, if too many bites are turning you into a blimp, why not put a little byte into your diet?

■ ■ ■

COMPUTER-HATERS UNITE

After a tough day at the computer, some users would be happy to see an elephant squash their machine, a boxer pulverize it, or a tribe sacrifice it. Unfriendly users can view all these scenes in *The Unofficial / Hate Computers Book*, by Rich Tennant and John Barry, a cartoon collection that pokes fun at the marvelous microchip.

There's even a "draw-it-yourself" cartoon contest encouraging readers to submit their own computer cartoons. Judges will select five cartoons to appear in the second edition. It's a way to get even with a cantankerous computer. □

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STATE OF THE ART

COMPUTER-AGE TV

BY LEN HULTS

You are watching a parade on TV. The camera is looking down from a tall building, but you want a closer look at the next float. You reach for the remote control box and touch a button. Suddenly the camera zooms in and the float looms large on the screen. You're seeing just what you wanted to see. Did you take control of the

television station? No, you just discovered one of the many feats possible with a new kind of television—digital TV.

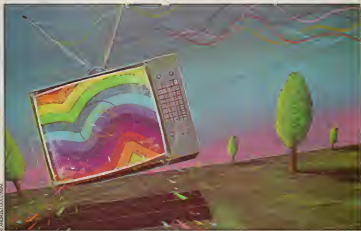
Using technology similar to that in a computer, digital television will provide the clearest, sharpest TV picture anyone has ever seen. It will let you zoom in on a scene, freeze a picture on the screen, and perhaps even allow you to split the screen and watch more than one station at a time. And because its technology is so similar to that used by computers, digital TVs can serve as high-resolution monitors that won't need a converter to hook up with home computers.

TV's Third Age

Digital TV marks the beginning of television's third age. First came black-and-white TV. Next was the age of color. Digital television is color TV with a difference.

Today's first- and second-age TVs use an analog (continuous) system. Signals are sent out by television stations in continuous waves. These waves, which travel parallel to the ground on the way to your antenna, can be distorted by storms, buildings, aircraft and other obstructions.

Even if the analog signal



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reaches your antenna without too much distortion, it must still be processed through your set. This processing separates the signal into the parts that carry sound, color and brightness. The separation is not easy, and seldom clean and sharp. Thus, even the best first- and second-age TV picture suffers some distortions—including ghosts, flickers, odd colors and flecks of light.

Digital TV will avoid distortions by using numbers instead of analog waves to produce picture and sound. The digital system in a TV will work in much the same way as the digital system in a computer does. A TV signal containing sound and picture data will be transmitted in binary code as a set of 0's and 1's. Each piece of binary code will describe a tiny part of the picture—a picture element or "pixel." When the digital TV receives this signal, it reconstructs the picture, pixel by pixel.

This binary code will be difficult to distort and very easy to process into sharp sound and pictures. The code can also be manipulated to create zoom, freeze and other similar special effects.

This binary-coded signal will be processed in the digital TV set by seven VLSI (Very Large Scale Integration) chips. These chips, engineers say, will do the work of 300,000 transistors and replace about 350 parts found in present-day TV sets.

How Digital TV Can Work Today

The perfect digital television system will take a digital signal and process it through a digital TV

set. However, not one TV station today is sending digital signals. Experts predict it may take five to ten years before most stations do transmit digital, rather than analog, signals.

But, even when processing analog signals, digital TV sets are expected to produce improved pictures.

In a small way, the age of digital



TV has already begun. "Many sets already use digital signals to handle channel selection and remote control," says Carl Michelotti, vice president for color TV engineering at Zenith. "The change to digital will be an evolution over the next five to 10 years."

Digital TV sets are already being sold in Germany. They should be available in the U.S. later this year. These first digital sets will be expensive, top-of-the-line models. Within the next few years, even the less expensive sets are expected to go digital. In the long run, digital technology should lower television set production costs. This will be possible because the VLSI chips used in digital sets will replace more than 300 existing television parts. The chips will cost only about \$30 to \$40 per set.

When the first sets are installed, the system will work like this: the digital set will take analog television waves and translate them into binary code. In that form, the VLSI chips will process the signals, get rid of ghosts and other distortions, and check for color, sound and picture quality. This cleaned-up signal will then be converted back to analog form and shown on the TV screen.

When a large number of digital sets have been sold, TV stations will convert their transmitters from analog to digital. This will eliminate the need to translate signals from analog to digital and back again. With a digital set processing a digital signal, the improvement in picture quality is expected to be even more striking.

Digital Future

But while the first digital TV pictures may seem very sharp, future developments are likely to add even more to the scene.

At the moment, for example, a TV picture is made up of 525 lines across the screen. Developments in digital TV systems will make it possible to put another line between each of these, bringing the total well above 1,000. This will help create an even sharper high-resolution picture.

In addition, digital technology may make it possible to develop two-way (interactive) TV on a large scale.

One thing is certain: with digital technology, you'll end up seeing details on the screen you didn't even know were there. E

LEN HOLTS lives in Chicago and writes about technology.

(Continued from page 9)

years old. It would be nice to see it redone today. They would improve the graphics and maybe add some sound effects. When I'm asked to find Rhode Island, I can't even see it because the map is a bit small.

PHIL: That's how you know it's Rhode Island.

THE GAME SHOW

(Computer Advanced Ideas; Apple II, 48K disk; \$39.95)



"The TV game show format is a good way of playing with information."—Bernie
"And the fact that you can create your own game files makes it even more attractive."—Phil

Basically, this is the old television game show of *Password*, in which you guess a word based on clues given by a partner. Only in this version, your partner is the computer.

The game itself is for two teams and is very good. A computer-graphic animated mouth moves, words appear in the cartoon-balloon, and you get the feeling that the computerized character is talking. Although the built-in vocabulary is tough, it's fun to see how far you can get against the

computer—then you can start your own word lists.

WRAP-UP

PHIL: I love the fact that you can play this with other people or all alone.

BERNIE: It's really a game for all ages.

HIGH RISE

(Microlearn; Atari, Apple, Commodore 64, and IBM PC, \$30.00)

"If there is a problem with the game, it is that gravity doesn't affect action like it would in real life."—Phil

"Sometimes you swear the blocks should come tumbling down, but they don't."—Bernie

This is a game of building towers from a large assortment of multi-colored blocks. Five bins on screen contain the block shapes your character can use. The object is to select blocks, position them on a springboard, send them onto the stack, and hope that everything remains stable. If you send a block to the wrong place, your whole stack comes tumbling down.

When your stack reaches a certain height without falling over, your character automatically climbs to the next more difficult level. It may sound like child's play, but *High Rise* is fun.

WRAP-UP

BERNIE: The graphics are low resolution, but that doesn't seem to interfere with the challenge. I think *High Rise* is remarkable, one of the best "educational games" I've ever played.

PHIL: My criticism is that you can only use the keyboard. No joysticks allowed. Ugh!

MUSIC CONSTRUCTION SET

(Electronic Arts; Apple II, Commodore 64, and Atari computers; \$40)

SONGWRITER

(Scarborough Systems; Apple II+ or IIe, Commodore 64, IBM-PC, and Atari computers; \$40)

FUN WITH MUSIC

(Epyx; VIC-20 and Atari computers; \$40)

"I enjoy synthesizing music on the computer. The program teaches me something I want to learn—how to write music."—Phil
"But I want the software to be very friendly. It has to let me play right away."—Bernie



These three programs can all make you a computer composer—but they each go about this in different ways, and at different levels.

Music Construction Set provides symbols to help you control what you do. For example, to hear your composition, you position the little hand over the piano symbol. To correct a mistake, you use the scissors. (This easy-to-follow nota-

tion was pioneered by Bill Budge in his hit of 1983, *Pinball Construction Set*.)

This kit gives you access to a whole variety of musical notation. The more you know about music, the more you can appreciate this software and make great sounds.

Songwriter, on the other hand, is for the novice. The screen uses a player-piano roll visual, which is simple to use. This software lets you enhance your composition by controlling speed of playback and other factors.

Fun with Music is the least impressive, and most limiting, of these three programs. You can only have about 200 notes in a composition (*Music Construction Set* gives you 700). And you can't store your creations without a tape or disk drive, something most VIC-20 owners do not have.

WRAP-UP

BERNIE: I liked Songwriter best, because I felt it was the easiest to understand. The visuals helped me, and I was delighted with the length of my compositions.

PHIL: I felt *Music Construction Set* was best, because it is a tool kit of real musical notation and composition.

SPACE SHUTTLE

(Activision, VCS; \$34.95)



"I love it. This is a thinking player's game with little hand/eye coordination required."

—Phil

"That's what I didn't like. I wanted to feel like I was flying the shuttle."

—Bernie

Space Shuttle is, in many ways, a computer simulation. These games are devoted to an accurate reproduction of a complex, real-life event.

The object of *Space Shuttle* is to rendezvous your shuttle with an orbiting satellite. You do it in six stages: launch, establishing orbit, docking, re-entry burn, re-entry to Earth's atmosphere, and landing the shuttle.

The joystick is used to maneuver the shuttle. But most of the game strategy involved making calculations and pushing switches. You have to keep your eye on all kinds of dials, and constantly make mid-course corrections.

Two overlays are used. One slips over all the switches, changing their functions so you can open and close the cargo bay doors. The second overlay is what real shuttle astronauts call a "cheat sheet." It contains information about how to fly the shuttle. A training and intermediate flight are included in case the real flight is too overwhelming.

WRAP-UP

PHIL: I think this unique cartridge makes great use of the VCS, giving people who own that machine access to a stimulating challenge. The graphics are great, sound is good, and you learn something about the operation of the real space shuttle.

BERNIE: But it's not fun. I wanted to feel like I was flying the shuttle through space. I think the result is an experience that seems real, but isn't enjoyable.

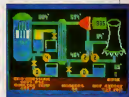
SCRAM

(Atari/Atari computers; cassette; \$24.95)

"*Scram*, like *Space Shuttle*, is not fun."

"I disagree. Sure, *Scram* is not fast-paced like *Pac-Man*, but it's good."

—Phil



Scram is perhaps less of a game than anything else in this column. It puts you in control of a nuclear power reactor. You must constantly monitor and adjust instruments, trying to prevent either a melt down or a shut down. A lengthy rule book is included, with more information on the history and workings of nuclear power in the U.S. than on how to play the "game."

Most of the player's actions consist of finding and solving problems as they occur—a kind of juggling act of all the variables. The risk factor increases as the player's skill increases. Just when you think *Scram* is easy, it gets tougher.

WRAP-UP

PHIL: If you buy this game to learn about nuclear reactors, you'll get your money's worth and then some.

BERNIE: But if you're buying it to have fun, you're going to be disappointed.

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FEEDBACK

(Continued from page 3)

PICTURE THIS

I have been reading articles about the KoalaPad since August. And I have been bugging my dad



to get me one, but he wouldn't—until he read the article about drawing pads in your Dec./Jan. '84 issue. He was really impressed, and so was I. On Christmas Day, I was happy to see that Santa had gotten me a KoalaPad. I'm sending you some pictures I have done in my first two days with the KoalaPad.

—Jeff Wild, 13
Cincinnati, OH

MACINTOSH SCOOP

I would like to know if you could run an article on the Apple Macintosh.

—Heath Rackley
Layton, UT

Dear Heath

No sooner said than done. Check out "News Beat" for Susan Myers' report on the Macintosh computer. And we'll have an in-depth review soon. —Ed.

MAKING MOVIES

In your March 1984 issue, you answered Susan Seybold's letter by saying that you just used the

"Computers: Movie Makers of the Future" issue as an advertising technique. I thought that, rather than it not existing, you might want to use the idea for a future issue! I hope you consider this idea.

—Michael Dumas
Washington, MI

Dear Michael:

We have given your idea a great deal of careful thought and have concluded you are absolutely right! Computers making movies is a great idea for a story. Details are pending, but watch for the July/August '84 issue of ENTER. We'll have a story about a super-computer that's helping to create whole scenes of the new movie "The Last Starfighter" from Universal.

—Ed.

JOGGING MEMORY

My first issue of ENTER was great. I enjoyed the "Jogging Poem Program." My friends and I are already making new poems for it.

I have a Commodore 64 computer and I would like to see more programs like "Boxy" or something like it.

—Peter Vescera
Metuchen, NJ

WRITE TO US!

We'd like to hear from you. Your ideas, questions and criticisms will help us make ENTER a better magazine. Send your letters to:

FEEDBACK
ENTER Magazine/CTW
1 Lincoln Plaza
New York, NY 10023

INPUT

ENTER POLL #4

We'd like to know about your experience with computers, and what you think of some of the articles in this month's *ENTER*. Your answers help us plan future issues, so please be honest. We'll send *ENTER* t-shirts to 50 of you, picked at random.

Mail your questionnaire by May 15 to: **INPUT #4, ENTER Magazine, P.O. Box 777, Ridgefield, N.J. 07557**

I. Tell us about yourself:

Name _____

Address _____

City _____ State & Zip _____

Grade _____ Age _____ Male _____ Female _____

T-shirt size Kids L _____ Adult S _____ M _____ L _____

Where did you get this issue of *ENTER*?

____ In the mail _____ At a computer store _____ At a bookstore or newsstand _____ Other (explain) _____

II. We'd like to know about you and computers:

A. Does your family own a computer? _____ Yes _____ No

B. Which kind? (Check as many as apply) _____ Apple

_____ Alan _____ IBM _____ Commodore 64 _____ VIC 20

_____ Timex/Sinclair (which model?) _____

_____ TI 99/4A _____ Other (Please indicate name and model) _____

C. What peripherals does your family own? (Check all that apply) _____ Disk drive _____ Joysticks _____ Printer

_____ Cassette Drive _____ Modem _____ Koala pad

_____ Chalkboard _____ Other (explain) _____

D. We'd like to know what you do with your computer. Do you:

1. Create graphics? _____ Yes _____ No

2. Write original programs? _____ Yes _____ No

3. Do your homework? _____ Yes _____ No

4. Do word processing? _____ Yes _____ No If yes, which program do you use? _____

5. Play games? _____ Yes _____ No

6. If you write your own programs, what language do you use? _____ Logo _____ BASIC _____ Pascal _____ Other (which one?) _____

III. Tell us what you think about this issue's articles.

A. Did you read the story on MAKING MONEY with your computer? _____ Yes _____ No If yes, what did you think of it? _____ Liked it _____ OK _____ Didn't like it

1. Have you ever used your computer skills to make money? _____ Yes _____ No. If yes, what did you do? _____

2. Do you have any plans to use your computer this summer to make money? _____ Yes _____ No. If yes, how? _____

B. Did you read THE DIARY OF A GAME DESIGNER? _____ Yes _____ No. If yes, what did you think? _____ Liked it _____ OK _____ Didn't like it

1. Have you ever tried to program a game on your computer? _____ Yes _____ No. Do you know anyone who did? _____ Yes _____ No

2. Have you ever approached a company with your idea? _____ Yes _____ No. What happened? _____

C. What did you think of our NEWS SECTIONS?

	Liked it	OK	Didn't like it
Newsbeat	_____	_____	_____
Showbeat	_____	_____	_____
Pacesetters	_____	_____	_____
Connections	_____	_____	_____

D. Last, but not least. In future issues of *ENTER*, I'd like to read about _____

NEXT

COMING IN JUNE

ROBOTS...ROBOTS...ROBOTS: The robots are coming home. An interview with robot inventor Hans Moravec and a look at what life's like with a robot around the house. Plus, a robot hall of fame and a way for you to win your own home robot.

VIDEO DEEJAY: Merrill Aldighien uses all kinds of high-tech tricks to help create some of today's hottest music videos.

COOKIN' WITH THE KITCHENS: How did three brothers all become game designers? Find out how Steve, Garry and Dan Kitchen grew up to create great games like

Space Shuttle and Keystone Kapers.

HARDWARE REVIEW: PCjr. An in-depth, hands-on review of the latest computer from IBM. What happens when this giant company creates a small home computer?

SOFTWARE REVIEW: A close-up look at Movie Maker, an innovative software tool that lets you create animation without a lot of programming.

PLUS: Hot news in Show Beat, News Beat and Pacesetters. News-you-can-use in Connections... Programming for nine different computers.

ANSWERS

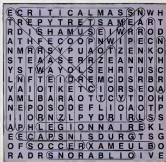
COMPUTER SCRAMBLE (page 50)

- | | |
|------------------|--------------------|
| 1. SAVE | 8. EPROM |
| 2. RUN | 9. FLOW |
| 3. RETURN | 10. OPEN |
| 4. DISK | 11. RESET |
| 5. BOARD | 12. SECTOR |
| 6. BUS | 13. READ |
| 7. LIST | 14. POINTER |

MEANDERING FLOWCHART (page 44)

Y, N, N, Y, N, N, N,
N, N, Y, Y, Y, Y, Y

GAME SEARCH (page 46)



WHAT DID THE COMPUTER SAY TO THE FLOPPY DISK?
LET'S GO FOR A DRIVE!



If your parents complain that this is what all computer games are doing to you, they obviously don't know about Spinnaker.

With most computer games the biggest challenge isn't the game. It's keeping your parents from objecting to it.

Now, Spinnaker has the answer: It's called the Learning Adventure Series, and it's a whole bunch of great games that will challenge and inspire your imagination for hours. But won't inspire hours of complaining from your parents.

Of course, even if they didn't offer this

one little benefit, our games would still be fantastic. Because they've got the kind of built-in, long-lasting excitement and adventure that make great games great. You'll explore, figure, and investigate your way through all kinds of situations. You can bargain with aliens, search a haunted house, even build your own railroad empire. And that's a lot more fun than most games that are "bad" for you.

So the next time your parents complain that computer games are turning you into a vegetable, tell them about Spinnaker's Learning Adventure Series.

Then you can get down to the business of fun and games in peace and quiet.

Spinnaker Learning Adventure games are available for Apple II, Atari II, IBM PC and Commodore 64 home computers.



It's New! TRAINS.
You're in charge of an old-time railroad—and whether it turns into a bonanza or a bust depends on how well you run it. But either way you'll find that working on this railroad is a challenge—and a lot of fun! **Ages 10-Adult.**



It's New! ADVENTURE CREATOR.
Design a challenging adventure game that you or a friend can tackle—or let one computer design one for you. It's complex, exciting—utterly addictive! **Ages 10-Adult.**

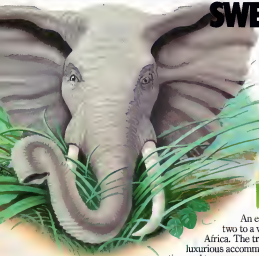


IN SEARCH OF THE MOST AMAZING THING.
It isn't easy to find—even in your 8-trails. But you'll have help from your Uncle Sensitive Snail as you search the universe to find the Most Amazing Thing. **Ages 10-Adult.**

SPINNAKER
We make learning fun.

Sticks for Apple II, IBM PC and Commodore 64 Cartridges for Atari and Commodore 64. (ADVENTURE CREATOR only)

ENTER THE ELEPHANT SAFARI SWEEPSTAKES.



GRAND PRIZE

(1 winner)



An exciting two week adventure for two to a wild game preserve in Kenya, Africa. The trip includes airfare, luxurious accommodations, meals, tips, and taxes.

SECOND PRIZE

(25 winners)



A Belt & Howell 35mm camera. The 35j

complete with fine Lumina lens completely eliminates complicated focusing.

THIRD PRIZE

(100 winners)



Camouflage

Nylon Duffle Bag. This handsome bag is water repellent and double reinforced at all stress points.

And thousands of Elephant Safari camouflage T-shirts featuring the Elephant logo.

FIRST PRIZE

(5 winners)

A Deluxe Camping Package featuring an 8' x 10' Wenzel Cabin Tent, four Wenzel sleeping bags, plus a Coleman lantern, stove and cooler.



HOW TO ENTER

No purchase necessary. Just come into a participating Elephant Safari Sweepstakes dealership where you'll find free entry blanks and official rules. While you're there, check out our full line of quality Elephant memory disks and accompanying products. Entries must be received by July 31, 1984. Void where prohibited.

Dermison



For the Elephant dealer nearest you, call 1-800-343-8413. In Massachusetts, call collect 617-769-8150.



ELEPHANT NEVER FORGETS

